TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1935

No. 356

WINE RAILWAY APPLIANCE COMPANY,
PETITIONER,

vs.

ENTERPRISE RAILWAY EQUIPMENT COMPANY

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SIXTH CIRCUIT

PETITION FOR CERTIORARI FILED AUGUST 12, 1935.

CERTIORARI GRANTED OCTOBER 14, 1935.

IN THE

United States Circuit Court of Appeals

SIXTH CIRCUIT

No. 349 IN Equity.

ENTERPRISE RAILWAY EQUIPMENT COMPANY,
Appellant,

vs.

WINE RAILWAY APPLIANCE COMPANY,
Appellee.

Appeal From the District Court of the United States for the Northern District of Ohio Western Division

Transcript of Record

TRIAL PLEADINGS AND TESTIMONY

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INDEX

	Page
Caption	1
Appeal from the District Court	2
Opinion of Circuit Court of Appeals filed April 6, 1928, on appeal from interlocutory decree (which is also Enterprise Exhibit 8)	2
Final decree of District Court, entered Sept. 12, 1928, pursuant to mandate of Circuit Court of Appeals	5
Amended and supplemental statement of account of Enterprise Railway Equipment Co.	8
Report of J. W. Wilson—Special Master	14
Plaintiff's Exceptions to Master's report	165
Memorandum of Opinion (Apl. 13, 1933)	167
Decree confirming Master's report	169
Request for and findings of fact and conclusions of law submitted by Wine Railway Appliance Co.	169
Memorandum Opinion, (June 15, 1933)	173
Order adopting findings of fact and conclusions of law of defendant	174
Stipulation and order extending time to lodge narrative to 8th day of August, 1933	174
Stipulation and order extending time to lodge narrative to August 30, 1933	175
Stipulation and order extending time to lodge narrative to September 15, 1933	175
Stipulation and order for filing record and docketing the appeal in the United States Circuit Court of Appeals to December 12, 1933	176
Petition for Appeal	176
Assignment of Errors	177
Order allowing Appeal and Fixing Bond	178
Supersedeas and Appeal Bond	179
Citation	180
Stipulation respecting Narrative Statement	181
Narrative statement of evidence, before special master	182
Certificate of Evidence	217

Order approving Narrative Statement of Testimony.... 217
Praecipe, stipulated 218
Stipulation re certification of record 222
Certificate of Clerk 223

TESTIMONY

Wine Railway Equipment Co.

Witness.	Di.	Cr.	Redi.	Recr.
Argyle Campbell	182			
Wm. E. Wine	190	192	194	195

Enterprise Railway Equipment Co.

Witness.	Di.	Cr.	Redi.	Recr.
Argyle Campbell	197	202	203	
George B. Dorey	204	211	211	
Argyle Campbell (recall)	215	216		

Rebuttal

	Di.	Cr.
Argyle Campbell	212	
William E. Wine	214	

EXHIBITS

Wine Railway Equipment Co.

Page

Exhibit A—Enterprise Drawing 3531A dated June, 1922, "Ingoldsby" door latch application type hopper car 24

Exhibit B—Enterprise drawing 3636-C dated January 13, 1923, "Ingoldsby" door latch application for B. & O. Class N-12 Hopper car 25

Exhibit C—Inquiry of B. & O. to Enterprise dated November 16, 1922 26

Exhibit D—Quotation of Enterprise to B. & O., dated November 21, 1922 27

Exhibit E—Schedule No. 461 Enterprise Railway Equipment "Ingoldsby" latch for 55 ton U. S. R. A Hopper Car and Enterprise drawing No. 3600 November 4, 1922, Ingoldsby Door Latch Application U. S. R. A. type hopper car 28, 29

Exhibit F—Letter of Enterprise Railway Equipment to B. & O. Railroad dated January 11, 1923 30

Exhibit G—Enterprise Drawing No. 3626 dated January 11, 1923, Ingoldsby Door Latch Arrangement for Hopper car. 31

Exhibit H—Correspondence Exhibit containing Wine Letter to B. & O. dated November 27, 1922; Telegram Beck to Wine dated January 8, 1923; Letter to Wine dated Jan. 9, 1923 32

Exhibit I—Campbell Patent No. 1,537,050; car construction issued to A. Campbell May 5, 1925 35

Exhibit J—Campbell Patent No. 1,537,051; railway car construction, May 5, 1925 43

Exhibit K—Wine drawings submitted to B. & O "five" 48

Number 3B-94 Wine Door Locks, Comp. Hopper cars 3-22-22 48

3B-97 Wine Door Locks Quadruple, March 24, 1922 49

3B-107 Wine Door Locks, Steel Gondolas, April 7, 1922 50

3B108 Wine Door Locks, Steel Hoppers, April 10, 1922 51

3B-110 Wine Door Locks, Twin Hopper, dated April 11, 1922 52

3B-148 Wine Door Locks, application to side dump hoppers, dated November 22, 1922 53

ENTERPRISE RAILWAY EQUIPMENT CO.

Exhibit 1—Photograph of Wine Lock submitted to B. & O. 54

Exhibit 2—Photograph of Wine Lock submitted to B. & O. 55

Exhibit 3—Pilcher Patent No. 1,434,145 car door arrangement issued to J. A. Pilcher Oct. 31, 1922 56

Exhibit 4—Kadel & Pilcher Patent No. 1,268,785 Railway car issued to B. W. Kadel & J. A. Pilcher June 4, 1918 59

Exhibit 5—Kadel Patent No. 1,434,123, Car Door Device issued to B. W. Kadel October 31, 1922..... 63

Exhibit 6—Kadel Patent No. 1,434,953, Door Mechanism for Railway Car issued to B. W. Kadel Nov. 7, 1922 67

Exhibit 7—Kadel Patent No. 1,434,954, Car Door Mechanism issued to B. W. Kadel Nov. 7, 1922..... 71

Exhibit 9—Drawing of infringing structure being page 123 printed record on previous appeal 74

Exhibit 10—Drawing infringing structure page 122 printed record on previous appeal 75

Exhibit 11—Comparison drawing Kadel patent in suit and Enterprise Infringing Lock 76

Exhibit 12—Letter Campbell to Sage dated January 5, 1923 77

Exhibit 13—Agreement between Sage and Wilder and Enterprise 78

Exhibit 14—Sage and Wilder Patent No. 1,204,692, Car door issued to R. V. Sage and R. E. Wilder November 14, 1916 82

Exhibit 15—Photograph No. 6270-LD showing Sage and Wilder device 87

Exhibit 16—Pencil drawing showing Sage and Wilder 88

Exhibit 17—Pencil drawing showing Sage and Wilder 89

Exhibit 18—Enterprise drawing No. 1661 June 3, 1915, door operating arrangement 90

Exhibit 19—Photograph B. & O. car 91

Exhibit 20—Pages 144, 145, 166, 167, and title page Car Builders Cyclopedia of American Practice, 1922 ..... 92, 93, 94

Exhibit 21—Letter December 4, 1922, Sandman to Campbell 95

Exhibit 22—Letter December 28, 1922, Campbell to Thornley 96

Exhibit 23—Agreement between Pressed Steel Car Company and Enterprise on Safety Clutch 98

Exhibit 24—Zimmer Patent No. 1,059,422, Car Door Operating Mechanism issued to A. E. Zimmer, April 22, 1913 101

Exhibit 25—Lindstrom Patent 865,920 Safety Clutch for Car Door Mechanism issued to C. A. Lindstrom, Sept. 10, 1907 105

Exhibit 26—Ingoldsby Patent 993,450, Dump Car issued to F. S. Ingoldsby, May 30, 1911 110

Exhibit 27—Campbell and Zimmer Patent 1,584,841, Car Door operating mechanism issued to A. Campbell et al, May 18, 1926 121

Exhibit 28—Campbell Patent 1,446,244, Dump Car, Issued to A. Campbell February 20, 1923 125

Exhibit 29—Campbell Patent 1,464,746, Dump Car Construction and door locking mechanism therefore issued to A. Campbell August 14, 1923 134

Exhibit 30—Campbell Patent 1,547,638, Car Door Latch, issued to A Campbell July 28, 1925 140

Exhibit 31—Drawing, assembly sheet attached to Plaintiff's interrogatories page 119, printed record on prior appeal 145

Exhibit 32—Campbell Patent 1,577,688, Dump Car, issued to A. Campbell March 23, 1926 146

Exhibit 33—Campbell Patent, 1,615,794, Dump car, issued to A. Campbell January 25, 1927 152

Exhibit 34—Campbell Patent, 1,615,795, Dump Car, issued to A. Campbell January 25, 1927 157

Proceedings in U. S. C. C. A., Sixth Circuit 225
Minute entry of argument and submission 225
Decree 225
Opinion, Moorman, J 226
Clerk's certificate 229
Order allowing certiorari 230

IN THE

United States Patent Office

NORTHERN DISTRICT OF OHIO,
WESTERN DIVISION, SS.

CAPTION

RECORD of the proceedings of the District Court of the United States within and for the Western Division of the Northern District of Ohio, in the cause and matter hereinafter stated, the same being finally disposed of at a regular term of said Court begun and held at the City of Toledo, in said District, on the last Tuesday in April, being the 25th day of said month in the year of Our Lord One Thousand Nine Hundred and Thirty-three, and of the Independence of the United States of America the One Hundred and Fifty-seventh, to-wit: on Thursday, the 15th day of June, A. D., 1933.

Present: Honorable Geo. P. Hahn, United States District Judge.

Present: Honorable John M. Killits, United States District Judge.

No. 349 IN Equity.
(Filed April 6, 1928)

ENTERPRISE RAILWAY EQUIPMENT COMPANY,

Plaintiff,

vs.

WINE RAILWAY APPLIANCE COMPANY,

Defendant.

Said action was commenced on the 5th day of December, A. D., 1922, and proceeded to final disposition at the

term and day above written, and during the progress thereof, pleadings and papers were filed, process was issued and returned and orders of the Court were made and entered in the order and on the dates hereinafter stated, to-wit:

NO. 4782

UNITED STATES CIRCUIT COURT OF APPEALS
SIXTH CIRCUIT

WINE RAILWAY APPLIANCE COMPANY,

Appellant,

vs.

ENTERPRISE RAILWAY EQUIPMENT COMPANY,

Appellee.

APPEAL FROM THE DISTRICT COURT, NORTHERN DISTRICT OF OHIO, WESTERN DIVISION

(Filed Aug. 16, 1928)

Decided April 6, 1928.

Before Denison and Moorman, Circuit Judges, and Cochran, District Judge.

Suit by appellant for infringement of Cremean Reissue, No. 15,360, May 23, 1922, and Kadel, No. 1,434,953, Nov. 7, 1922, upon door locking means for railway dump cars. The District Court found no infringement of either patent. We speak of appellant and appellee as plaintiff and defendant respectively.

Denison, Circuit Judge:

In view of the accumulation of undecided cases, we state in this case only our conclusions,—in form sufficient, it is thought, for the information of counsel.

Claim 19 of Cremean is not infringed. The principles of lever action do not permit us to find a fulcrum located on the weight.

We hesitate to think that claims 4, 5, 6 and 7 of Cremean can be valid and yet not be infringed, for defendant's departure in form is that mere reversal of parts which does not avoid even a narrow claim. The parts involved are functionally ratchet and pawl. The claims put the pawl on member A and the ratchet on member B; the

defendant reverses them; and, excepting in the detail affected by the Kadel patent, does nothing else.

It was a common expedient to provide a door with a two step latch. The member carrying the step feature, serving as the ratchet, might be either the door or the frame. Several applications of this had been made to the hinged tailboard reaching the bottom of a wagon box, intended for carrying dirt, coal, etc., which would fall out or could be pushed out when the tailboard or door swung down and open. These disclose in different forms the use of a pivoted and swinging hook as one of the engaging members. Sometimes the steps were provided by notches upon this hook. Sometimes the pivoted hook was attached to the wagon box and the door made step by step engagement. Sometimes suitably notched swinging hooks were attached to the door and made successive engagements with a fixed stop upon the wagon box. When we exclude from consideration the presence in the patented combination of an efficient fulcrum point provided on the hook,—(or at least not upon the swinging door)—as we must because defendant does not use it,—we find nothing in the Cremean patent but the application of this familiar device to a swinging door in the bottom of a railway freight car (Eng. —waggon) intended for carrying coal. Sizes and strains and weights were different; the acceptance by the public is impressive; but the case seems to us so clearly one of a purely analogous use, with merely mechanical adaptation, that we think these claims must be held valid.

Claim 3 of Kadel is drawn rather broadly to a construction which, compared with Cremean specifically and the earlier art generally, is merely that reversal of parts which counsel for the plaintiff has convincingly argued does not amount to invention. It must be deemed invalid.

Kadel's claim 2 is confined to his specific construction, and in view of the selection by defendant of this particular form out of the variety of forms open to it, we are not satisfied to say that it involved no invention. Instead of extending from the outer end edge of the swinging door some appropriate form of a bracket or extension carrying

ledges or notches for successive two step engagement with the swinging hook, he uses a piece of ordinary channel iron having one of its flanges attached to the outer face of the door and projecting beyond its end, making the web of the channel iron to be at right angles to the door and the other flange to be parallel to the door and two or three inches away. He then employed these already existing flanges of the channel iron as his two successive engaging ledges. This was simple but ingenious. The construction plainly is cheap, strong and efficient. Channel iron had always been familiar, but during the years of experimenting with this type of device, no one had ever thought of using it. It does not appear that it had ever been used as a two step engaging member in any art. We consider this claim valid.

We also think defendant does not escape infringement by the change which it has made. Kadel places his pivoted engaging hook adjacent to the open side of the channel iron. For his final step, the hook swung under what would then be the bottom or outside flange of the channel; for his first step it swung into the open side of the channel, engaging the upper flange thereof. The claim calls for "a hook pivoted upon the car and arranged to seat in either flange of the said channel, the hook being so arranged and proportioned that when seated beneath one of the said flanges the door will be held in a partly closed position, and when seated beneath the other flange the door will be held in a fully closed position." The defendant reverses its channel so that the open side is away from the hook. For the final step the hook seats beneath the lower flange of the channel precisely as in the Kadel, except from the other side; to accomplish the first step defendant cuts an opening in the channel web, through which opening the hook projects to a position beneath the upper flange. It is true that this opening is placed slightly down from the lower side of the upper flange, so that the hook does not directly engage this upper flange but rather the upper edge of the opening in the web. No purpose is apparent in this unnecessarily awkward and expensive construction unless it be to escape infringement; and it fails in this purpose.

The claim does not literally require that the hook shall successively bear against the under surface of the two flanges, if in some other equivalent way it is seated beneath them. For all functional purpose the slight portion of the web against which the hook bears is a part of the upper flange, and the hook does not fail to be seated beneath it because it is also a slight distance below. It is true that defendant does not use the ordinary rolled channel; it constructs a rather complicated bracket; but the part which projects and co-operates with the hook has the characteristic web and flanges, and is a channel.

That plaintiff has never made or sold this Kadel form is not controlling. It has the right to exclude competitors from this form while it markets others,—whatever its reasons may be.

Considering the purpose of interrogatories, the defendant's answer that it had made and sold the devices before suit commenced should not be construed as reasonably referring to a time before the patent issued; but it should be taken as an admission of that conduct which is infringement if the device is of infringing character.

The decree should be affirmed as to the Cremean patent, and as to the Kadel patent should be reversed with the direction to enter the usual infringement decree upon claim 2. Since by this appeal and our decree, the validity of claim 2 is finally adjudged, we think that before the decree for injunction and accounting is entered, and within a reasonable time to be fixed by the court below, there should be a disclaimer under claim 3. The Master should also be instructed to find and report a reasonable royalty, for use if the court should decide it to be the appropriate measure. Appellant will recover one-half the costs of this court; costs in the court below will be fixed by that court.

FINAL DECREE

(Entered September 12, 1928, Killits, Judge)

This cause having come on to be heard on plaintiff's bill and defendant's counterclaim, and a decree having been

entered on April 10, 1926, wherein it was ordered, adjudged and decreed that both the bill of complaint and the counterclaim be dismissed with each party paying its own costs and one-half of the fees of the stenographer, and an appeal having alone been taken by the defendant, The Wine Railway Appliance Company, to the United States Circuit Court of Appeals for the Sixth Circuit from the portion of said decree dismissing defendant's counterclaim, and said appeal having been heard by said Court and the mandate of said Court having been issued on August 15th, 1928 and filed in this Court on August 16th, 1928, the same directing that said decree of this Court be affirmed in part and reversed in part, with one-half of the costs of said appeal to be recovered by appellant, The Wine Railway Appliance Company, and the cause remanded to this Court with directions to enter the usual decree for an injunction and accounting as to claim 2 of the Kadel patent No. 1,434,953 in suit, and it appearing to the Court that a disclaimer has been entered by defendant in the United States Patent Office as to claim 3 of said Kadel patent No. 1,434,953 in accordance with the decision on appeal;

Now, Therefore, it is Ordered, Adjudged and Decreed as follows:

(1) That the decision of the United States Circuit Court of Appeals for the Sixth Circuit be and it hereby is made the decision of this Court.

(2) That defendant herein is the owner of U. S. Reissue Letters Patent No. 15,360, issued May 23, 1922, to William F. Cremean, for "Railway Car", and U. S. Letters Patent No. 1,434,953, issued November 7, 1922, to Byers W. Kadel, for "Door Mechanism For Railway Cars".

(3) That each of claims 4, 5, 6 and 7 of said Cremean re-issue patent No. 15,360 are invalid.

(4) That claims 18 and 19 of said Cremean re-issue patent No. 15,360 are not infringed.

(5) That said Kadel Letters Patent No. 1,434,953 are good and valid as to claim 2 thereof; that said plaintiff, Enterprise Railway Equipment Company, has infringed

upon claim 2 of said Letters Patent and upon the rights of defendant herein by manufacturing, using and selling, or procuring the manufacture, use and sale of door mechanisms for railway cars containing and employing the invention set forth in said Letters Patent, and particularly specified in claim 2 thereof.

(6) That claim 3 of said Kadel Letters Patent No. 1,434,953 is invalid.

(7) That the defendant, under its counterclaim, recover of the plaintiff the profits, gains and advantages which it has received or made, or which have arisen or accrued to it from the said infringement of claim 2 of said Kadel patent No. 1,434,953, together with the damages which defendant has sustained by reason thereof, and since it does not appear what such profits, gains, advantages and damages may be, it is further

Ordered, that for special reasons shown this cause be referred to J. W. Wilson, Esquire, as Master, to ascertain and take and report to the Court an account of the said profits, gains and advantages, and also to assess the said damages suffered by the defendant, and that such Master also find and report a reasonable royalty for use if the Court should decide it to be the appropriate measure.

(8) That on such accounting the defendant have the right to cause an examination of the plaintiff, its officers, servants, agents, attorneys and employes ore teuns, or otherwise, and also to cause the production of the books, documents and vouchers of the said plaintiff, and that said plaintiff (Enterprise Railway Equipment Co., by its officers, servants, agents, attorneys and employes) attend for the purpose of such accounting before said Master from time to time as he shall direct.

(9) That a perpetual injunction be issued herein against the said plaintiff, Enterprise Railway Equipment Co., and its officers, clerks, attorneys, agents, servants and workmen, and each of them, enjoining and restraining them from making, constructing, using, vending, delivering, working, or putting into operation for use, or in any wise counterfeiting or imitating the said invention in said Let-

ters Patent No. 1,434,953 set forth, or any mechanism like or similar to those which said plaintiff has heretofore made, sold, operated or used, or caused to be made, sold, operated or used, in infringement of claim 2 of said Letters Patent, and from in any way further infringing upon said claim of said Letters Patent or upon the rights of defendant thereunder.

(10) That the defendant recover of the plaintiff one-half of the costs on appeal; that each party bear its costs heretofore accrued in connection with the proceedings in this Court, and that the question of the costs hereinafter sustained is reversed until the coming in of the Master's report.

AMENDED AND SUPPLEMENTAL STATEMENT OF ACCOUNT

(Filed June 17, 1932)

State of Illinois, County of Cook, ss.

Argyle Campbell, being first duly sworn, deposes and says that he is president of Enterprise Railway Equipment Company, defendant to the counter-claim herein; that the statements of account attached hereto were prepared under his direction; that he has examined said statements of account and that said statements are true and correct, as he verily believes, of the matters called for by the order of Master J. W. Wilson entered herein on December 31, 1929.

Affiant further states that the record in this cause contains no proof that the Wine Railway Appliance Company, defendant and counter-claimant, gave notice to the public, as provided in Section 4900 of the Revised Statutes of the United States (Section 49, Title 35, U. S. Code), by marking its patented articles in accordance with the law; or that Enterprise Railway Equipment Company, defendant to the counter-claim, was duly notified of its infringement except by the filing of the counter-claim herein on, towit, April 25, 1923.

Affiant further states that Enterprise Railway Equipment Company is advised that the accounting period here-

in begins with the date of the filing of the counter-claim herein, to-wit, April 25, 1923; that the order of the Master entered December 31, 1929, directs an accounting from November 7, 1922, the date of issuance of the patent in suit held to be infringed, Kadel, No. 1434953; that the account hereto attached consists of two parts, first, a statement beginning the account as of November 7, 1922, and second a statement beginning the account as of April 25, 1923, the date of filing of the counter-claim.

With reference to the decree of the District Court entered on or about September 12, 1928, directing the Master to "find and report a reasonable royalty for use if the Court should decide it to be the appropriate measure", affiant states that claim 2 of the Kadel patent, the only claim held to be infringed, comprises in combination a door hinged to a car body, a channel secured to the door, and a hook pivoted upon the car arranged to operate in the manner described in said patent; that the defendant manufactured and sold but one element of said claim, that is, the hook or latch and the parts necessary to pivot it upon the car body; that 25c a car set is a reasonable royalty for the manufacture and sale of said latch, which constitutes, as aforesaid, but one element of the claim adjudged to be infringed.

The items appearing in the annexed statements of account as "Sage and Wilder Royalty" cover a royalty of 50c a car paid Ralph V. Sage and Ralph E. Wilder, licensors to Enterprise Railway Equipment Company under United States Letters Patent No. 1,204,692, the sale of the latch sets in question including the right to make and use the device of that patent.

Argyle Campbell.

Subscribed and sworn to before me this 7th day of May, A. D. 1931.

Meta Schmidt,
Notary Public.

(Seal)

ACCOUNT BEGINNING NOVEMBER 7, 1922,

Date of Issue of Patent in Suit.

Purchaser and Date of Order	Number of Sets Sold	Freight deducted by Car Co.	Cost Price Foundry Invoice	Selling Price
American Car & Foundry Co. Jan. 11, 1923	1,000 and replacements not charged for	$6.20	$6465.72	$12,000.00
Ralston Steel Car Co. Jan. 10, 1923	500 and an "extra" not charged for		3256.11	6,000.00
Pressed Steel Car Co. Jan. 10, 1923	1,500 and replacements		9763.20	18,048.70
Standard Steel Car Co. Jan. 15, 1923	500 and replacements not charged for	36.04	3265.93	6,000.00
Youngstown Steel Car Co. Feb. 5, 1923	500	.98	3251.69	6,000.00
	4,000	$43.22	$26002.65	$48,048.70

Amended and Supplemental Statement of Account.

		Selling Price
Cost Price	$26,002.65	
Freight Deducted	43.22	$26,045.87
Overhead 33⅓%	8,681.96	
Sage & Wilder Royalty	2,000.00	
Total expense	$36,727.83	
Selling Price	$48,048.70	
Rebate of 50c a set	2,000.00	
Total Received	$46,048.70	
Total expense	36,727.83	
	$ 9,320.87	
Federal Income Tax 12½%	1,165.11	
	$ 8,155.76	

ACCOUNT BEGINNING APRIL 25, 1923

Date of Filing of Counter-Claim

Purchaser and Date of Order	Number of Sets Sold	Sets Shipped After April 25, 1923	Freight Deducted	Cost Price (Foundry Invoice)	Selling Price
American Car & Foundry Co. Jan. 11, 1923	1,000 and replacements not charged for	699 and replacements not charged for		$ 4,556.26	$ 8,388.00
Ralston Steel Car Co. Jan. 10, 1923	500 one extra not charged for	499 and one extra not charged for		3,249.39	5,988.00
Pressed Steel Car Co. Jan. 10, 1923	1,500 and replacements	1082 and replacements		7,044.26	13,032.70
Standard Steel Car Co. Jan. 15, 1923	500 and replacements not charged for			9.48	
Youngstown Steel Car Co. Feb. 5, 1923	500	499	.98	3,245.27	5,988.00
	4,000	2779	.98	$18,104.66	$33,396.70

Amended and Supplemental Statement of Account.

		Selling Price
Cost Price	$18,104.66	
Freight Deducted	.98	$18,105.64
Overhead, 33⅓%	6,035.21	
Sage & Wilder Royalty	1,389.50	
Total expense	$25,530.35	
Selling Price	$33,396.70	
Rebate 50c per set	1,389.50	
Total Received	$32,007.20	
Total Expense	25,530.35	
	$ 6,476.85	
Federal Income Tax 12½%	809.61	
	$ 5,667.24	

REPORT OF SPECIAL MASTER

(Filed June 17, 1932)

To the Honorable Judges of said Court:

The undersigned, appointed Special Master in the above entitled case under a decree entered herein on the countr-claim of the defendant on the 12th day of September, 1928, to ascertain and take and report to the court an account of the profits, gains and advantages which the plaintiff has received or made, or which have arisen or accrued to it, from the infringement of Claim 2 of the patent granted to Byers W. Kadel November 7, 1922, No. 1,434,953, together with the damages which defendant has sustained by reason thereof; also to find and report the reasonable royalty for use, if the court should decide it to be the proper measure; such Master respectfully submits the following report.

In response to the Master's summons and order, the plaintiff (following a motion to quash and to vacate) produced statements showing the number of devices sold by it since November 7, 1922. These statements covered two periods, one beginning November 7, 1922, the date of the patent in suit, the other the period beginning April 25, 1923, the date of the filing of the counter-claim.

The statement for the first period is as follows:

"Account beginning November 7, 1922,

Date of Issue of Patent in Suit.

Purchaser and Date of Order	Number of Sets Sold	Freight deducted by Car Co.	Cost Price Foundry Invoice	Selling Price
American Car & Foundry Co. Jan. 11, 1923	1,000 and replacements not charged for	$ 6.20	$ 6465.72	$12,000.00
Ralston Steel Car Co. Jan. 10, 1923	500 and an "extra" not charged for		3256.11	6,000.00
Pressed Steel Car Co. Jan. 10, 1923	1,500 and replacements		9763.20	18,048.70
Standard Steel Car Co. Jan. 15, 1923	500 and replacements not charged for	36.04	3265.93	6,000.00
Youngstown Steel Car Co. Feb. 5, 1923	500	.98	3251.69	6,000.00
	4,000	$43.22	$26002.65	$48,048.70

Cost Price	$26,002.65	
Freight Deducted	43.22	$26,045.87
Overhead 33⅓%	8,681.96	
Total Expenses	$34,727.83	
	48,048.70	
Rebate of 50c a set	2,000.00	
Total Received	$46,048.70	
Total Expenses	34,727.83	
	$11,320.87	
Federal Income Tax 12½%	1,415.11	
	$ 9,905.76	"

"Account Beginning April 25, 1923

The statement for the second period is as follows:

Date of Filing of Counter-Claim.

Purchaser and Date of Order	Number of Sets Sold	Sets Shipped After April 25, 1923	Freight Deducted	Cost Price (Foundry Invoice)	Selling Price
American Car & Foundry Co. Jan. 11, 1923	1,000 and replacements not charged for	699 and replacements not charged for		$ 4,556.26	$ 8,388.00
Ralston Steel Car Co. Jan. 10, 1923	500 one extra not charged for	499 and one extra not charged for		3,249.39	5,988.00
Pressed Steel Car Co. Jan. 10, 1923	1,500 and replacements	1082 and replacements		7,044.26	13,032.70
Standard Steel Car Co. Jan. 15, 1923	500 and replacements not charged for			9.48	
Youngstown Steel Car Co. Feb. 5, 1923	500	499	.98	3,245.27	5,988.00
	4,000	2779	.98	$18,104.66	$33,396.70

Cost Price	$18,104.66	
Freight Deducted	.98	$18,105.64
Overhead 33⅓%	6,035.21	
Total Expenses	$24,140.85	
	33,396.70	
Rebate 50c a set	1,389.50	
Total Received	$32,007.20	
Total Expenses	24,140.85	
	$ 7,866.45	
Federal Income Tax 12½%	983.30	
	$ 6,883.15	"

Defendant filed objections and exceptions to all figures, computations and estimates of plaintiff's profits shown in these statements of account; especially objection to the items of overhead, rebate and Federal income tax. Some months later the plaintiff, upon leave of the Master, filed an amended and supplemental statement of account, adjusting the items of the Federal income tax claimed, and adding to its expense an item of royalty paid under the Sage & Wilder Patent, thus reducing the total profits shown by the first statements to that extent.

Mr. Campbell, president of the plaintiff company, states (pp. 76, 77, 78) that the infringing transactions were merely an incident to the regular business of the plaintiff company. No details are given to show how the 33⅓% overhead claimed in these statements is arrived at, or the items that go to make it up.

The Master feels that the evidence produced is not sufficient showing on which to allow an item of expense for overhead of 33⅓%. This is particularly true in view of the way in which these orders were handled. On page 19 Mr. Campbell testified that in this case formal orders to cover the materials wanted, with the drawings, were sent to the foundry which manufactured the parts for them; that the parts were then shipped directly to the railroad companies, and that his company had no handling of them, only inspection.

It is contended on behalf of defendant that Enterprise Company is not entitled to any segregation or apportionment of profits on account of the infringing structure including features patented to it, for the reason

(1) that the entire marketability of the infringing structure was dependent on features covered by the Wine Company patents, namely, the double-step feature;

(2) that Enterprise Company has not shown by any proof that any feature covered by any of its patents had any controlling influence on the infringing sale, and

(3) that if any part of the profit on the infringing sale was due to any feature controlled by Enterprise, it is prevented from taking advantage of the same by reason;

according to the testimony of its President, of it so keeping its accounts that even an estimate of the amount of profits due to any one feature could not be determined, thereby placing Enterprise Company under the requirements of the "Confusion" rule. With this the Master agrees.

Mr. Campbell states that his books and records do not show what portion of plaintiff's profits was due to any feature or features of the various patents submitted by plaintiff, and that he had no way of estimating this unless it would be an estimate on the basis of the number of latches per car and the number of patents involved under which the device was alleged to be manufactured. It is, therefore, held that plaintiff is not entitled to any apportionment of profits.

The Master is of opinion that Federal income taxes are not properly deductable as an expense in an infringement accounting proceeding. This matter seems to be decided in the case of Larson vs. Wrigley, 277 U. S. 97.

Omitting the items of overhead and Federal income tax, the Master finds that the accounts should be presented as follows:

Account beginning November 7, 1922:		
4000 car sets—Sales Price		$48,048.70
Deductions—		
Cost Price	$26,002.65	
Freight	43.22	
Sage & Wilder Royalty	2,000.00	
Rebate of 50c per set	2,000.00	30,045.87
Profit		$18,002.83
Acount beginning April 25, 1923:		
2779 car sets—Sales Price		$33,396.70
Deductions—		
Cost Price	$18,104.66	
Freight	.98	
Sage & Wilder Royalty	1,389.50	

Rebate of 50c per set	1,389.50	20,884.64
Profit		$12,512.06

It appears that the plaintiff and defendant here were the only active bidders for this business. The plaintiff had been using the single step latch, and defendant was the only other bidder putting out a latch of the double step type. Apparently the railroad company was desirous of changing from the expensive door-raising mechanism it had been using on its dump cars to those of a latch type; that it wanted the double step type; such as alone put out at that time by the Wine Company; that the Enterprise Company, to secure the order, changed its single step lock to a double step construction; that the Wine Company had the first refusal of the B. & O. order at a price set by the B. & O., and that the Enterprise Company, after the refusal of the Wine Company, accepted the order at the price offered, and that in all probability the Wine Company would have received the order had it not been under-bid by the Enterprise Company.

No testimony as to damages suffered has been presented by the defendant, so that that question is not considered by the Master.

Mr. Wine, president of the defendant company, testified (pp. 83, 84) that his company never manufactured, used or sold any locks under the Kadel patent except a few for experimental purposes; that the only ones he knew of being made are those furnished by the Enterprise Company to the Baltimore & Ohio Railroad Company.

Defendant's counsel contend that under these circumstances there could not have been a marking under the provisions of Sec. 4900 R. S., and that such Section, therefore, does not apply. Counsel cites the case of Dunlap vs. Schofield, 152 U. S. 240, in which the court says the patentee or his assigns "if he makes or sells the article patented, he must give notice by marking the article patented." The same interpretation of this statute has been applied by

the Court of Claims in the case of Olson vs. U. S., 9 Pat. Q. 111, 125.

Counsel have cited a number of cases on this subject, but the one referred to above seem to apply more especially to this case, and the Master is constrained to agree with counsel that Sec. 4900 R. S. does not apply.

The direction to the Master to find and report a reasonable royalty has given considerable trouble. The plaintiff submits two licenses, one for the use of an improvement in safety clutch device at a royalty of ten cents per car; another on a door flanging, on a royalty of fifty cents per car. The defendant, in its examination of Mr. Campbell (p. 83) brought out the testimony that the Enterprise Company collected a royalty of five dollars per car under Patent Nos. 1,537,050 and 1,537,051 for certain car construction. Neither of these licenses is very helpful in determining what is a reasonable royalty in this case.

In the statement of account as amended and presented above, the profit as shown is $4.50 per car. In view of the fact that there was no manufacturing cost to the plaintiff, that all they did was some drafting, obtained the order and turned the order and drawings over to a foundry for manufacturing, with possibly some inspection, if they were required to pay a royalty of $3.00 per car for the use of he patented device, they would still have a net profit of $1.50 per car, or a total profit of $6000.00 on the 4000 cars—a very substantial amount. The Master, therefore, finds that a reasonably royalty for the use by the plaintiff of the patent in suit would be $3.00 per car.

CONCLUSION

The Master, therefore, reports and finds:

That the profits of the plaintiff on the infringing device made and sold during the period beginning April 25, 1923, the date of filing of the counterclaim, amounted to $12,512.06, and that the total profits of the plaintiff beginning November 7, 1922, including the period after the filing of the counterclaim, amounted to $18,002.83, and that

the plaintiff should be required to account to the defendant for this $18,002.83, together with interest at the rate of six per cent (6%) from the date of this report until paid.

That no actual damage has been shown by the defendant company, and that the question of damages, apart from the question of reasonable royalty, should not be further considered by the court.

That plaintiff is not entitled to any apportionment of profits.

That should the court find the profits as stated above not to be proper, and that the award to defendant should be placed on a reasonable royalty basis, such reasonable royalty should be $3.00 for each of the 4000 cars equipped with the infringing device, making a total of $12,000.00, and the plaintiff should be required to account to the defendant for this amount, together with interest at the rate of six per cent (6%) per annum from the date infringement ceased, which may be fixed as May 1, 1923.

That no article involving the construction of the patent involved in the accounting having been made or sold by the defendant in accordance with the requirements of Section 4900 R. S., said section does not apply.

The testimony and exhibits offered in evidence before the Master are filed herewith.

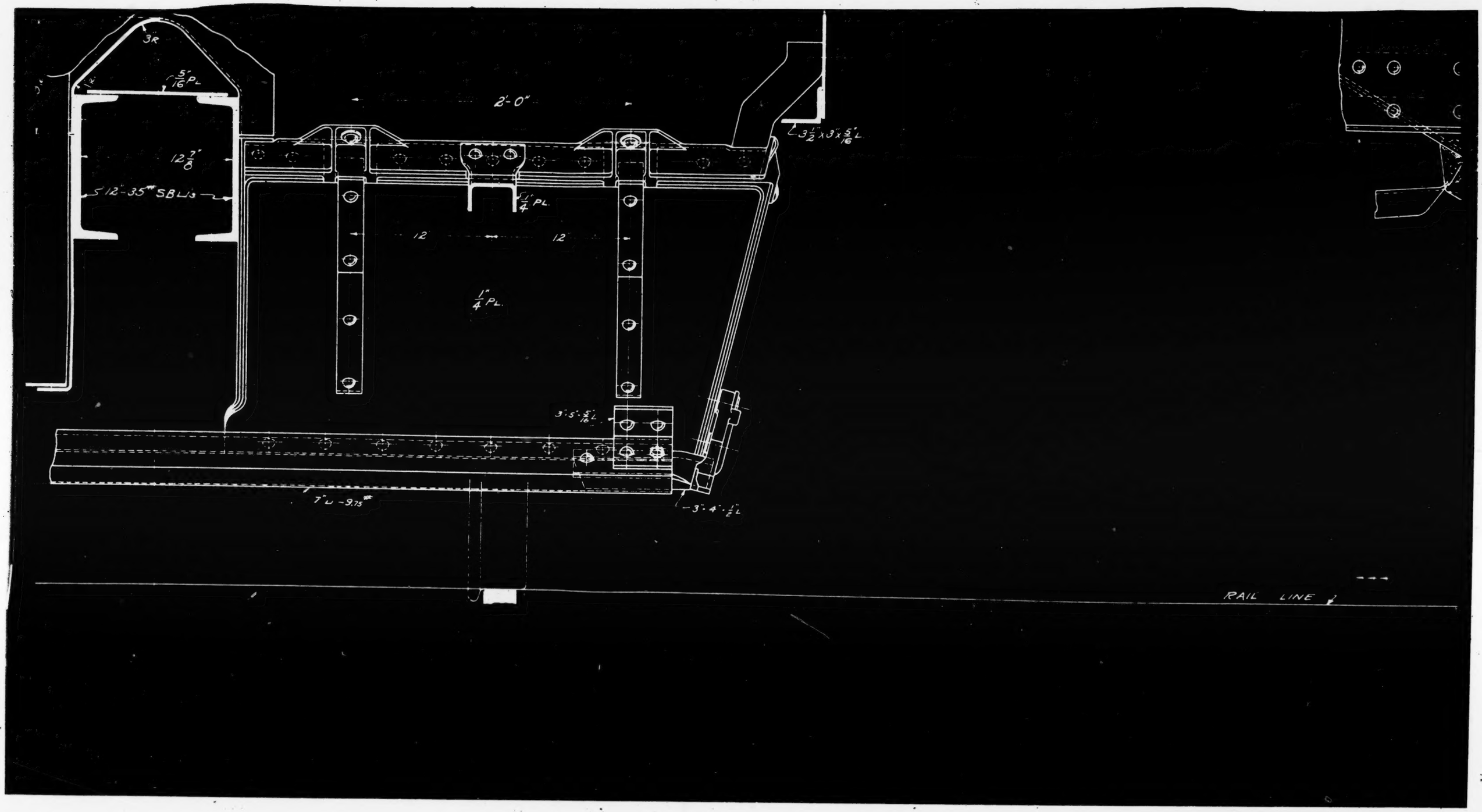
All of which is respectfully submitted.

J. W. Wilson,
Special Master.

Time employed by Master in hearing arguments on objections to plaintiff's statement of account and motion to quash, taking testimony, considering same, and writing report, and hearing objections to same, 20 days.....$

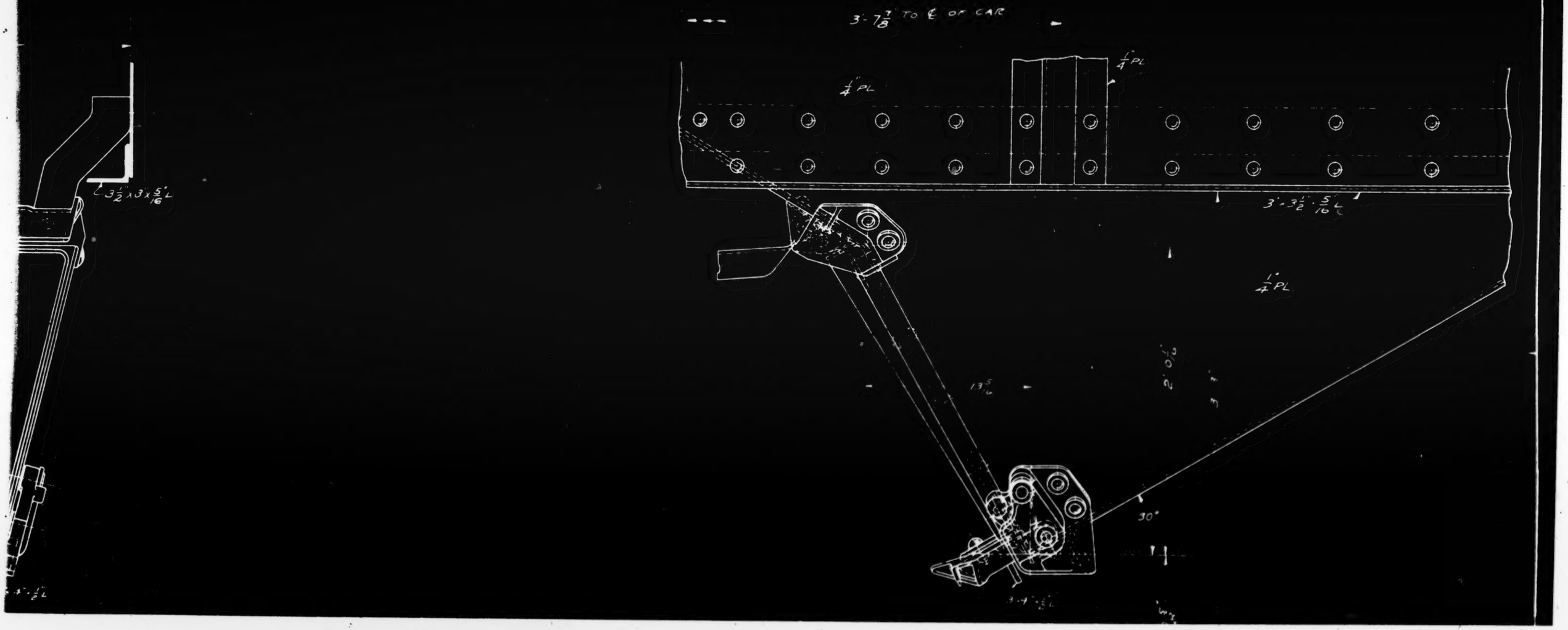
Expense, typing reports, including four carbon copies 15.00

4 - 8 3/4"
3R
5/16" PL.
2'-0"
12 7/8"
12 - 35# SB L 3
1/4" PL.
12
12
1" PL.
3 1/2" x 3" x 5/16" L
3 - 5" x 5/16" L
7" L - 9.75#
3 - 4" x 1/2" L


3R
5/16 PL.
2'-0"
12 7/8"
12"-35# SB L's
L 3 1/2" x 3" x 5/16" L.
1/4 PL.
12
12
1" PL.
3'-5-5/16" L
7" L - 9.75#
3'-4-1/2" L
RAIL LINE

ENTERPRISE RAILWAY
EQUIPMENT CO.
THE ROOKERY CHICAGO

"INGOLDSBY" DOOR LATCH APPLICATION
U.S.R.A TYPE HOPPER CAR



L 3½ x 3 x 5/16 L

3'-3½ · 5/16 L

1'-1/4 PL

13 5/8

2'-0 1/2

3"

30°

10'-8"

3'-6" TO ℄ OF CAR

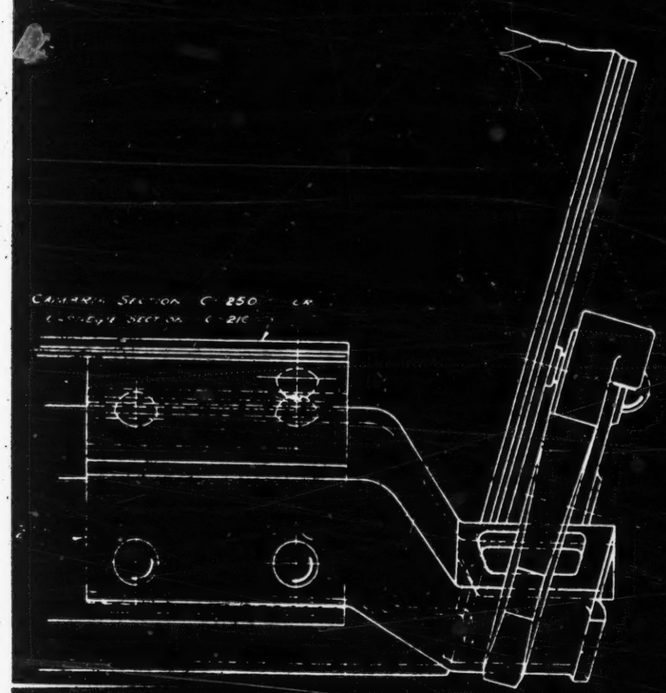
RAIL LINE ℄

RE-ISSUE
DRWG NO 3531-A DOORBRACE EXTENSION
JULY 11 1922 CHANGED WAY ℄ TO

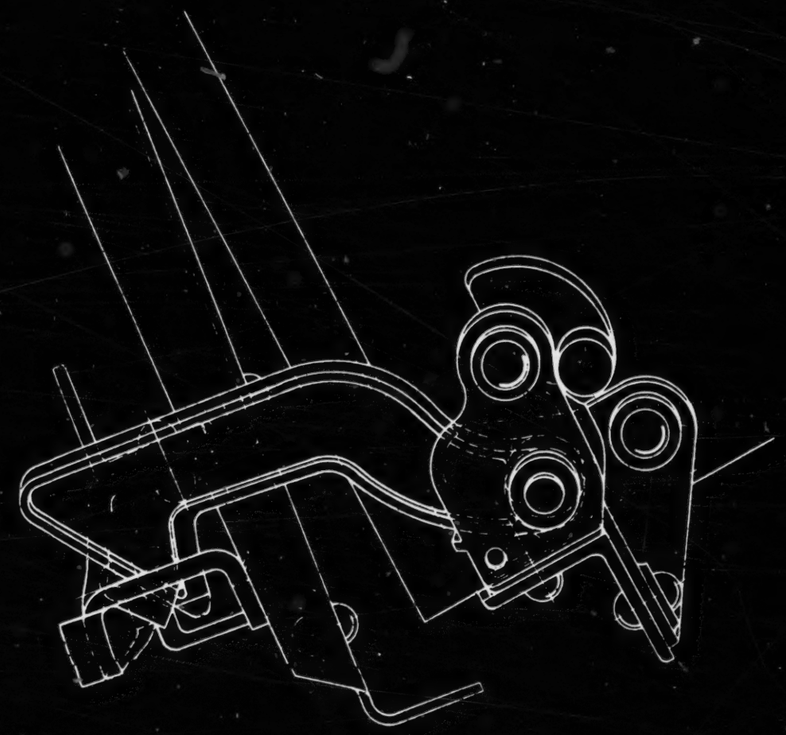
DRAWING NO. 3531-A
JUNE 5 1922

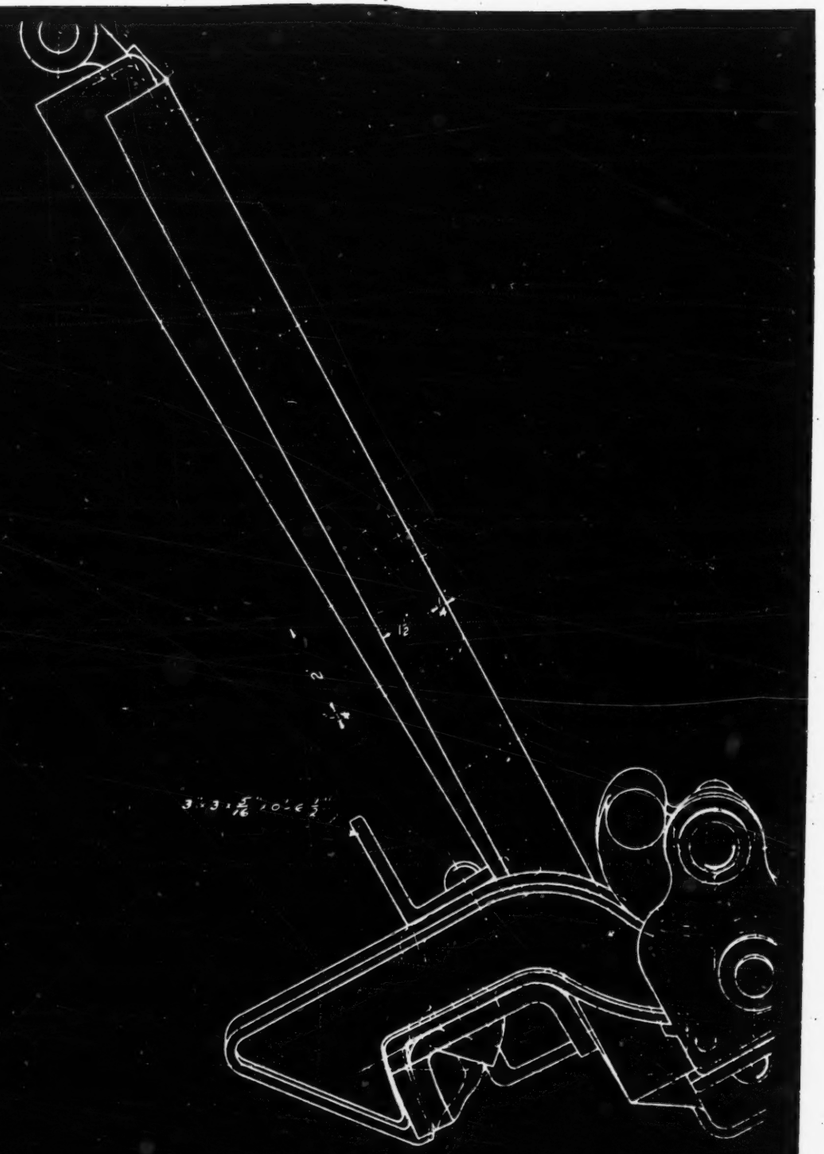
VIEW ILLUSTRATING WEARING OF GOGGLES AT CENTER OF EAR

VIEW ILLUSTRATING FLARING OF DOOR FLANGE AT CENTER OF CAR



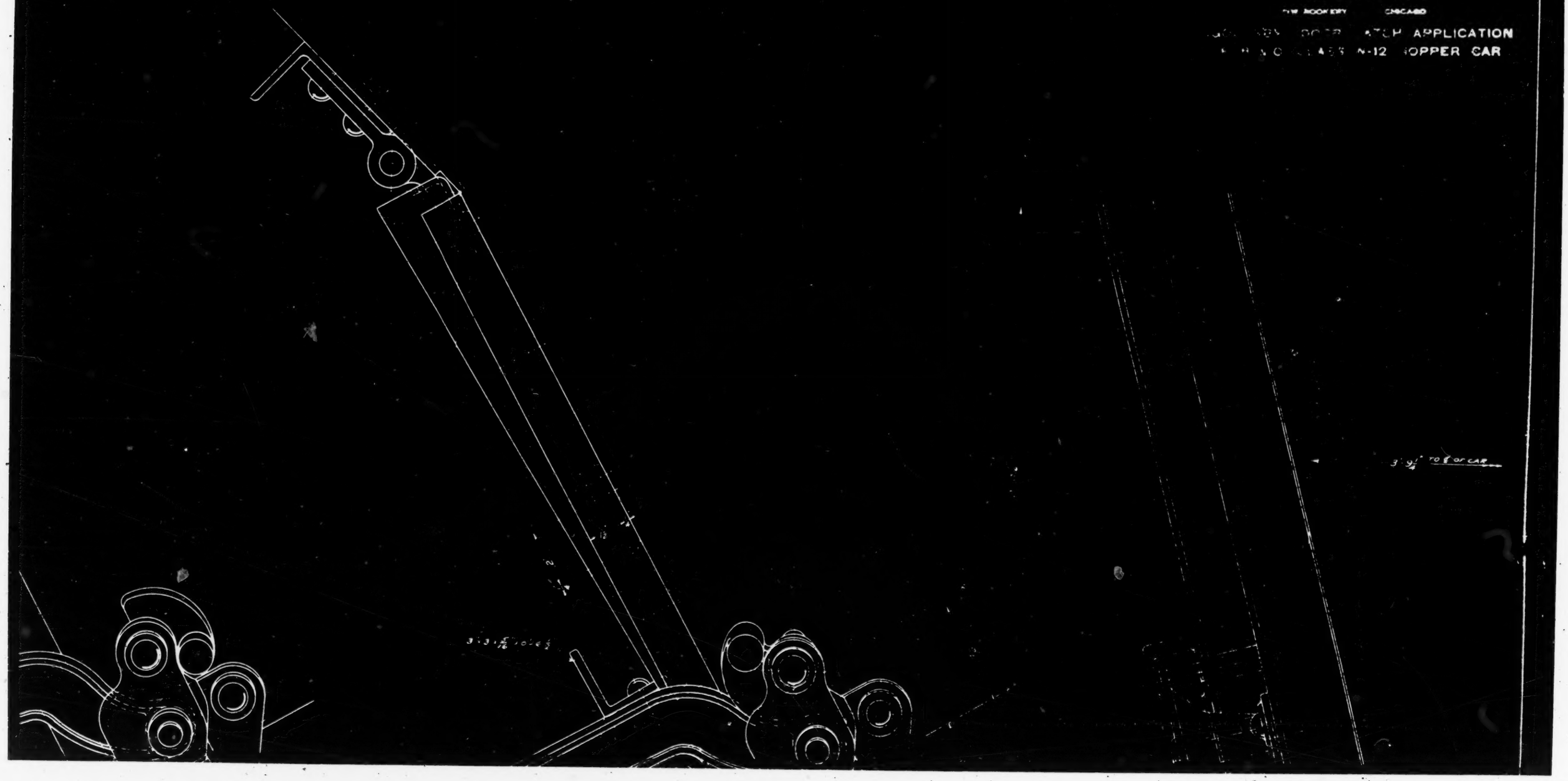
CAMARO SECTION C-B50 CR
CHEVELLE SECTION C-B1C

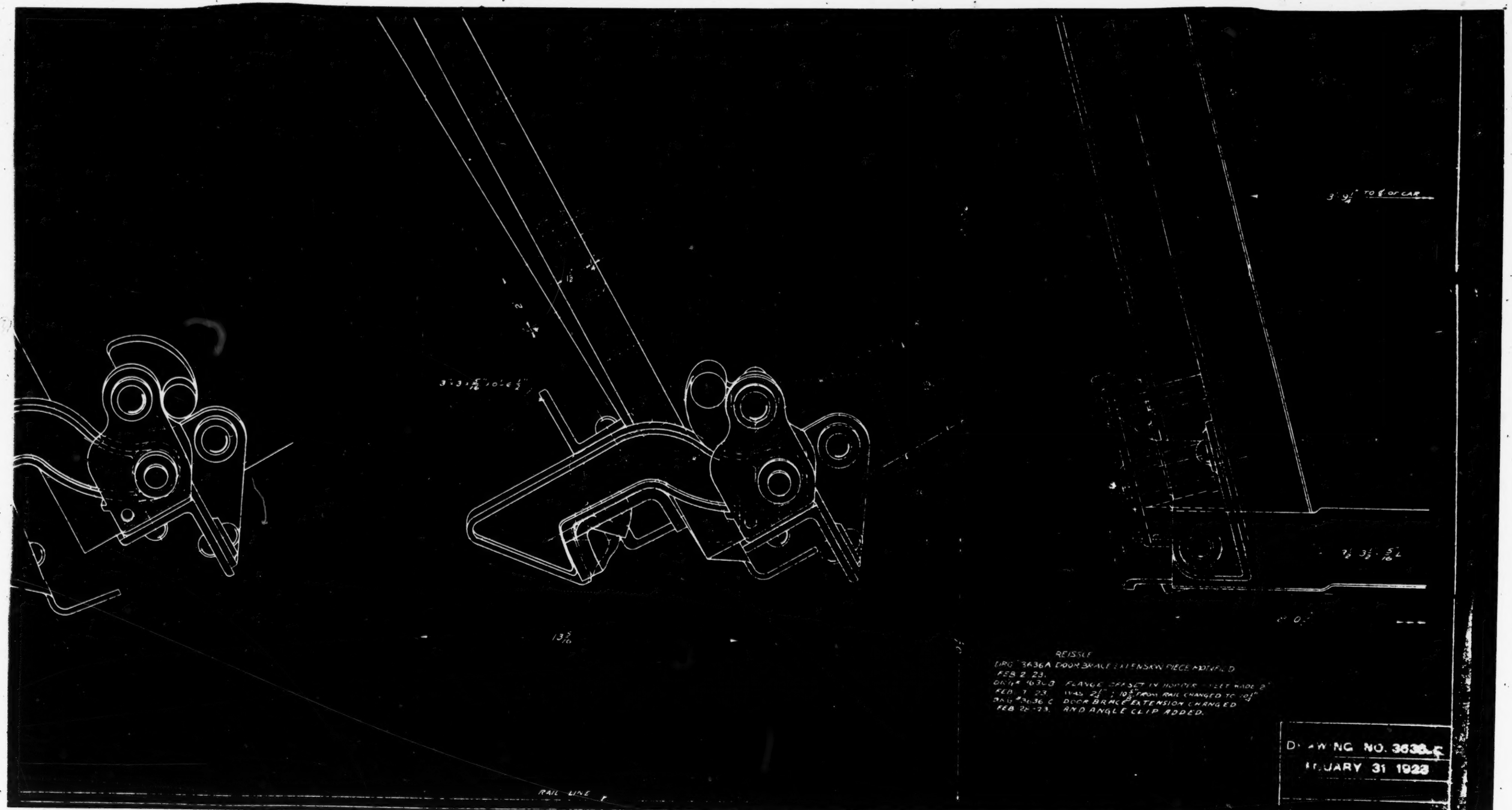




ENTERPRISE RAILWAY
EQUIPMENT CO.
CHICAGO

[illegible] HATCH APPLICATION
[illegible] N-12 HOPPER CAR





REISSUE
ORG 3836A DOOR BRACE EXTENSION PIECE MDIFIED
FEB 2 23.
DRG 1630 FLANGE OFFSET IN HOOKS "LEFT HAND 2"
FEB 7 23. WAS 2 1/4" ; 10 3/8" FROM RAIL CHANGED TO "10 1/4"
DRG #3836 C DOOR BRACE EXTENSION CHANGED
FEB 21-23. AND ANGLE CLIP ADDED.

DRAWING NO. 3838-C
FEBRUARY 31 1923

WINE CO. EXHIBIT C

THE BALTIMORE & OHIO RAILROAD COMPANY.
Office of Purchasing Agent.
Baltimore, November 16, 1922.

Subject:—Proposed construction of 2,000 class X-12-G All Steel Hopper Cars Complete.

Enterprise Rwy. Equipment Co.
209 So. LaSalle St.,
Chicago, Ills.

Gentlemen:—

Various Car Builders have been asked to submit proposals covering the construction of the above equipment. We would be glad to entertain your proposal on the following specialty:—

Ingoldsby Latch Door Operating Mechanism

1.—State the price you will make the Car Builder per car set, delivered at their works.

2.—State the lowest price you will make the Baltimore & Ohio Railroad Company, delivered at the Car Builders' works.

3.—Net Cash Allowance you will make the Baltimore & Ohio Railroad Co.

Please give the information exactly as asked for and, to receive consideration, your quotation should reach this office not later than November 29th.

In that connection, would state that the bids on the cars are not closing until the 4th of December, and, if it is your intention to have a representative here in connection with your proposal, it is suggested that he defer his visit until the 8th or thereafter, although, please understand that it is not essential that you have a personal representative here in connection with your bid, as, by offering your lowest price in the beginning, it will receive the same consideration as those from firms whose representatives call.

Very truly yours,
W. S. GALLOWAY,
Purchasing agent.

File No. 2-leh.

WINE CO. EXHIBIT D

November
21st,
1922.

Mr. W. S. Galloway, Purchasing Agent,
Baltimore & Ohio Railroad Company,
Baltimore, Maryland.

Dear Sir:—

We have your favor of the 16th instant, File No. 2-leh, Subject:—Proposed construction of 2000 Class X-12-G All Steel Hopper Cars Complete:

To date we have forwarded blueprints and made quotation upon our "Ingoldsby" Latch to the following Car Builders:

American Car & Foundry Company
Standard Steel Car Company
Pressed Steel Car Company
Ralston Steel Car Company
Mt. Vernon Car Manufacturing Company
General American Tank Car Corporation

To each of the above Car Companies we have made the same net quotation for the castings, delivered at their works, namely, Twelve Dollars ($12.00) per car set, net thirty days, which would also be the net quotation to your Company; this in accordance with our usual practice.

Mr. W. S. Galloway..... 2

Our schedule No. 461 herewith enumerates the parts forming the "Ingoldsby" Latch and indicates the castings we would propose furnishing at the above price of $12.00 per car set.

Trusting that we may be of service to your Company, I am

Very truly yours,

President.

D

WINE CO. EXHIBIT F

January
11th,
1923.

Mr. W. S. Galloway, Purchasing Agent,
Baltimore & Ohio Railroad Company,
Baltimore, Maryland.

Dear Sir:—

This will acknowledge receipt of copies of your letters of the 27th ultimo, File No. 2, to the various Car Companies in connection with the 4000 Class N-12-G Hopper cars which your Company has purchased. We note these cars are to be built as follows:

500—Ralston Steel Car Company
1000—American Car & Foundry Company
500—Standard Steel Car Company
1500—~~Pressed~~ Steel Car Company
500—Youngstown Steel Car Company

We are glad that our "Ingoldsby" Latch is to be applied and in accordance with the note added to the letters above mentioned, we will reimburse your Company Fifty Cents ($.50) per car on this specialty.

We enclose herewith two sets of blueprints illustrating the application, our drawing No. 3626, and the detail parts as specified on our schedule No. 477 also enclosed.

As soon as we receive formal approval of these drawings we will be pleased to proceed with the manufacture of the castings which we are to furnish.

Very truly yours,

D President.

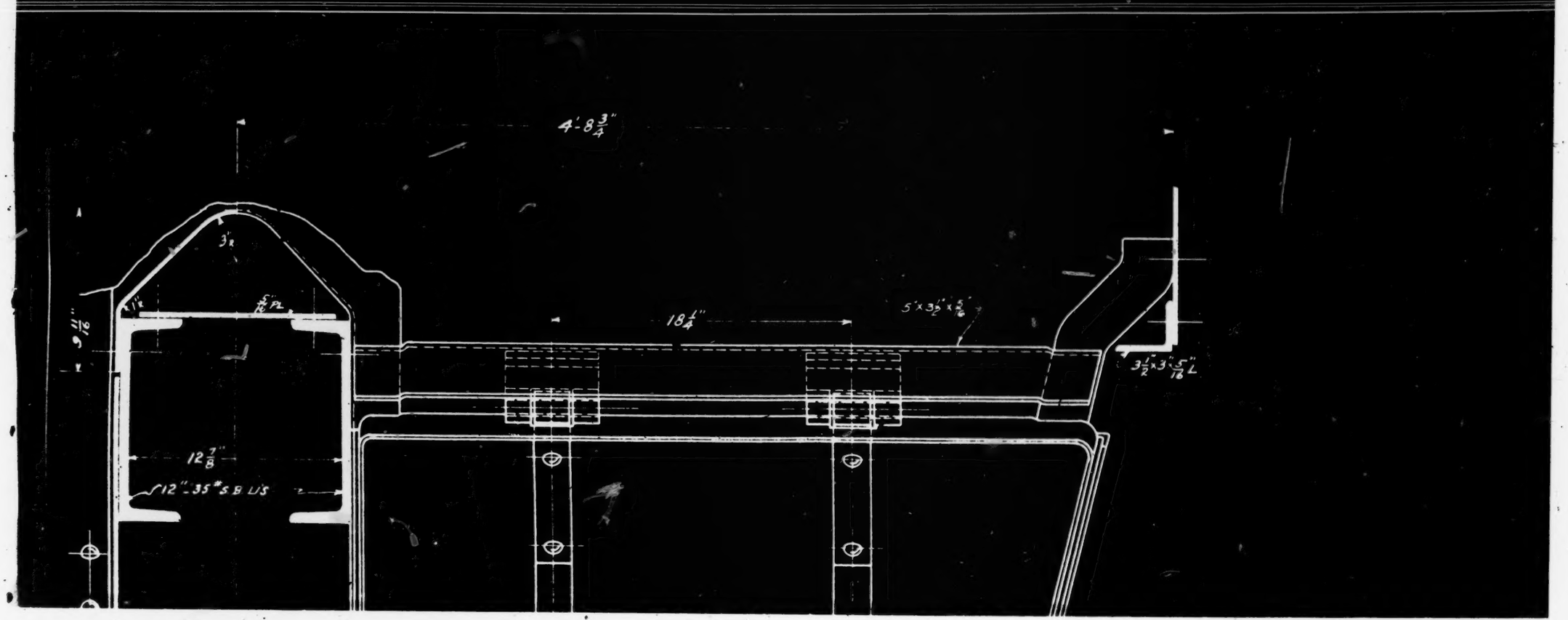
SCHEDULE NO. 461

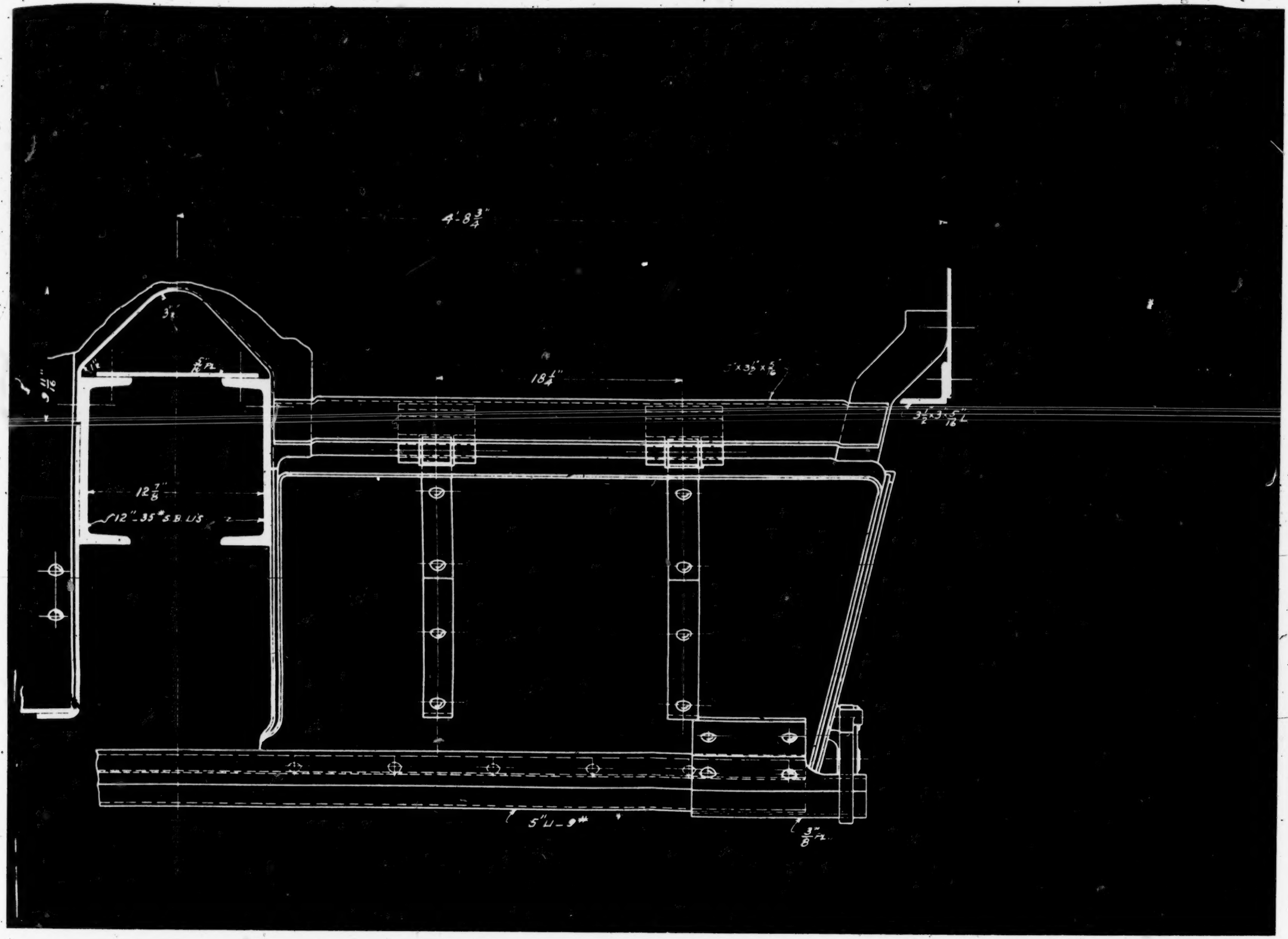
ENTERPRISE RAILWAY EQUIPMENT CO. "INGOLDSBY" LATCH FOR 55 TON U.S.R.A. HOPPER CAR

ARRANGEMENT DRAWING NO. 3600

No. per Car.		Mat'l.	Patt'. No.	Draw. No.	Furnished by
4	Hooks	M.I.			E. R. E. Co.
2	Latch Dogs - As shown	M.I.			E. R. E. Co.
2	Latch Dogs - Reverse	M.I.			E. R. E. Co.
2	Fulcrum castings - As shown	M.I.			E. R. E. Co.
2	Fulcrum castings - Reverse	M.I.			E. R. E. Co.
4	Fulcrum Pins	OHS. or M.I.			Car Company.
4	3/4" Pipe thimbles	OHS. or M.I.			Car Company.
2	Door Brace Extensions-As shown	OHS. or M.I.			Car Company.
2	Door Brace Extensions-Reverse	OHS. or M.I.			Car Company.

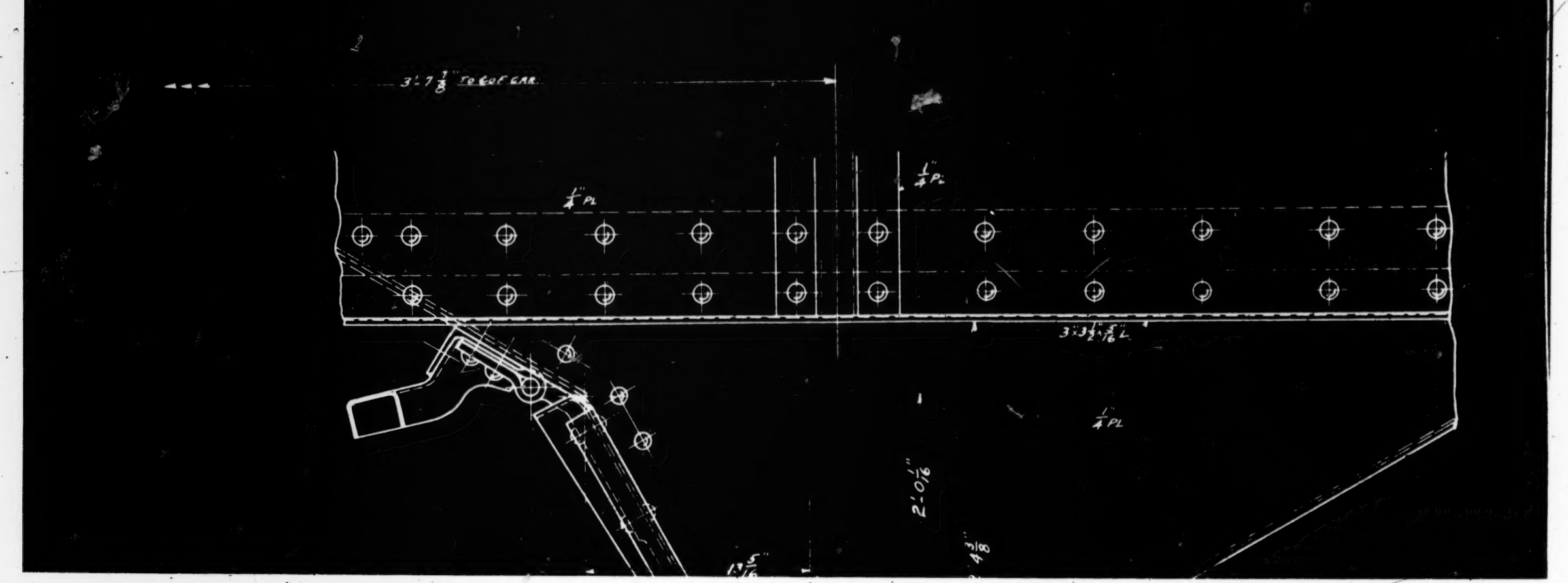
All pins, rivets, bolts, cotters, nuts, washers, to be furnished by the Car Company.

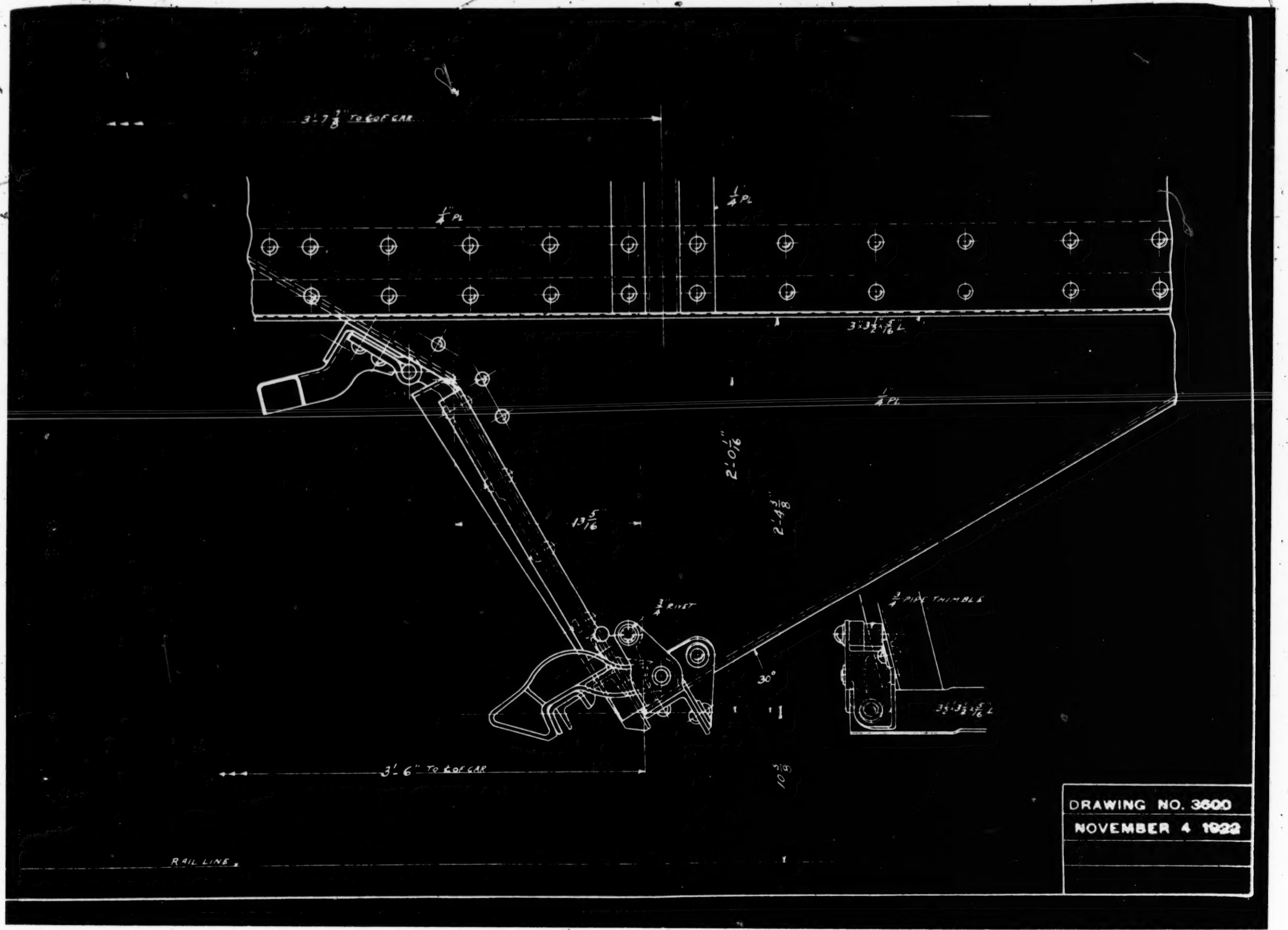

4'-8 3/4"
3/8
1/2
5/8" PL
9 11/16"
18 1/4"
5"x3 1/2"x 5/16"
3 1/2"x3 1/2"x 5/16" L
12 7/8"
12"-35# S B I/S


4'-8 3/4"
3"
5/16" Fl.
9 11/16"
18 1/4"
3 1/2" x 3" x 5/16" L
12 7/8"
12" - 35# S.B. I/S
5" U - 9#
3/8" Fl.

ENTERPRISE RAILWAY
EQUIPMENT CO.
THE ROOKERY CHICAGO

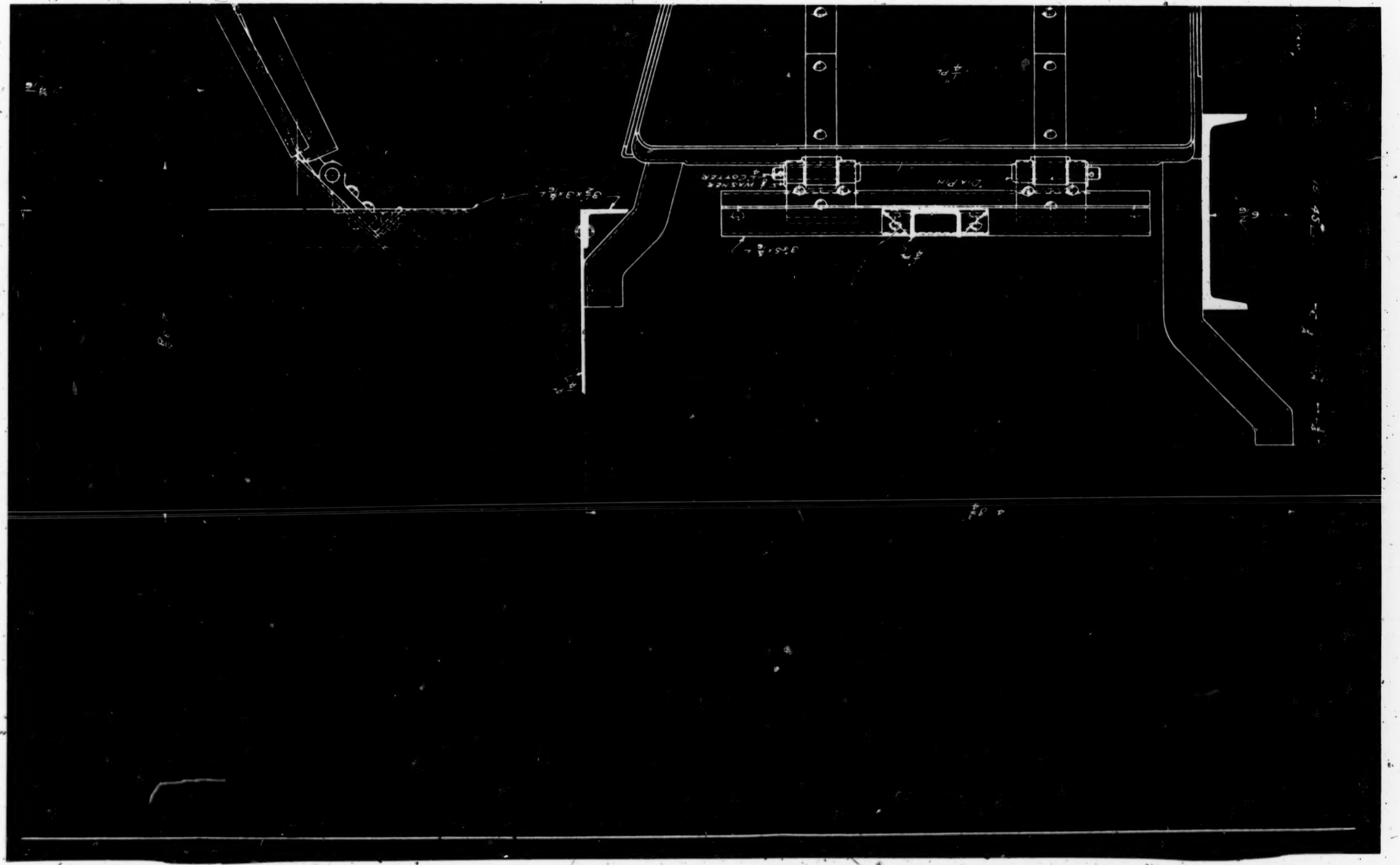
INGOLDSBY DOOR LATCH APPLICATION
U.S.R.A TYPE HOPPER CAR





DRAWING NO. 3600

NOVEMBER 4 1922



4' 8¾"

6 2/16

15-45# L

1/4" PL

3"x3"x5/16" L

5/8" DIA PIN

5/8" WASHER & 1/4" COTTER

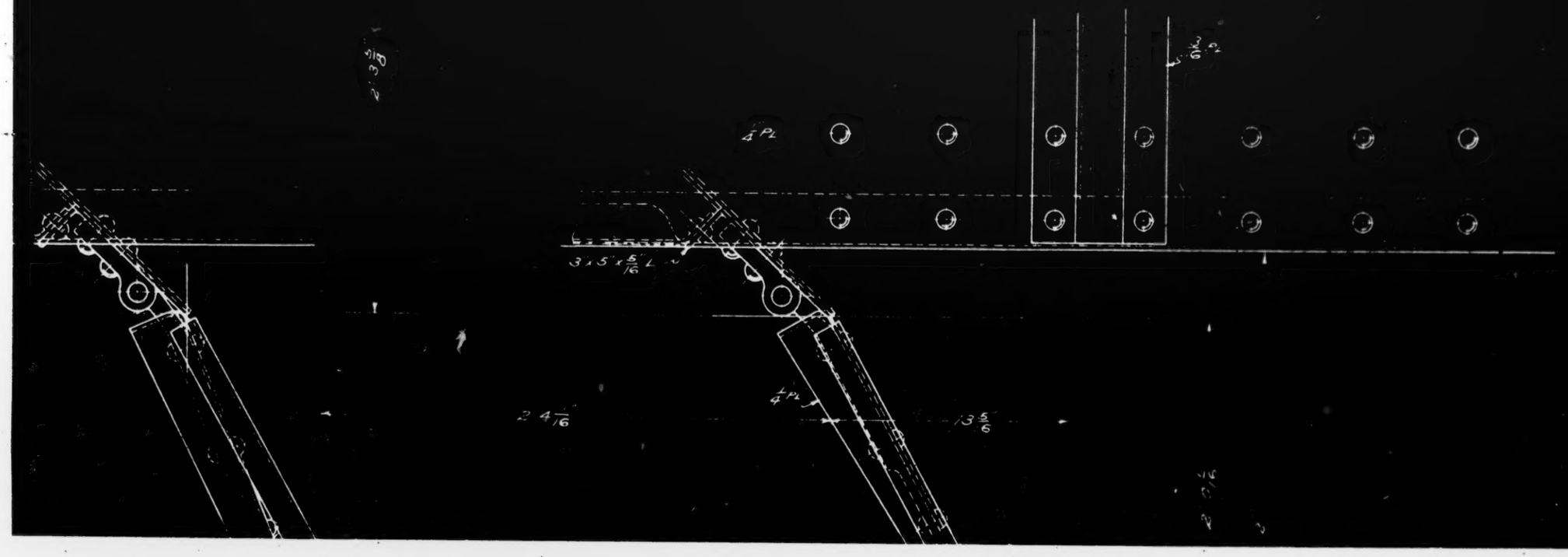
3½"x3"x5/16" L

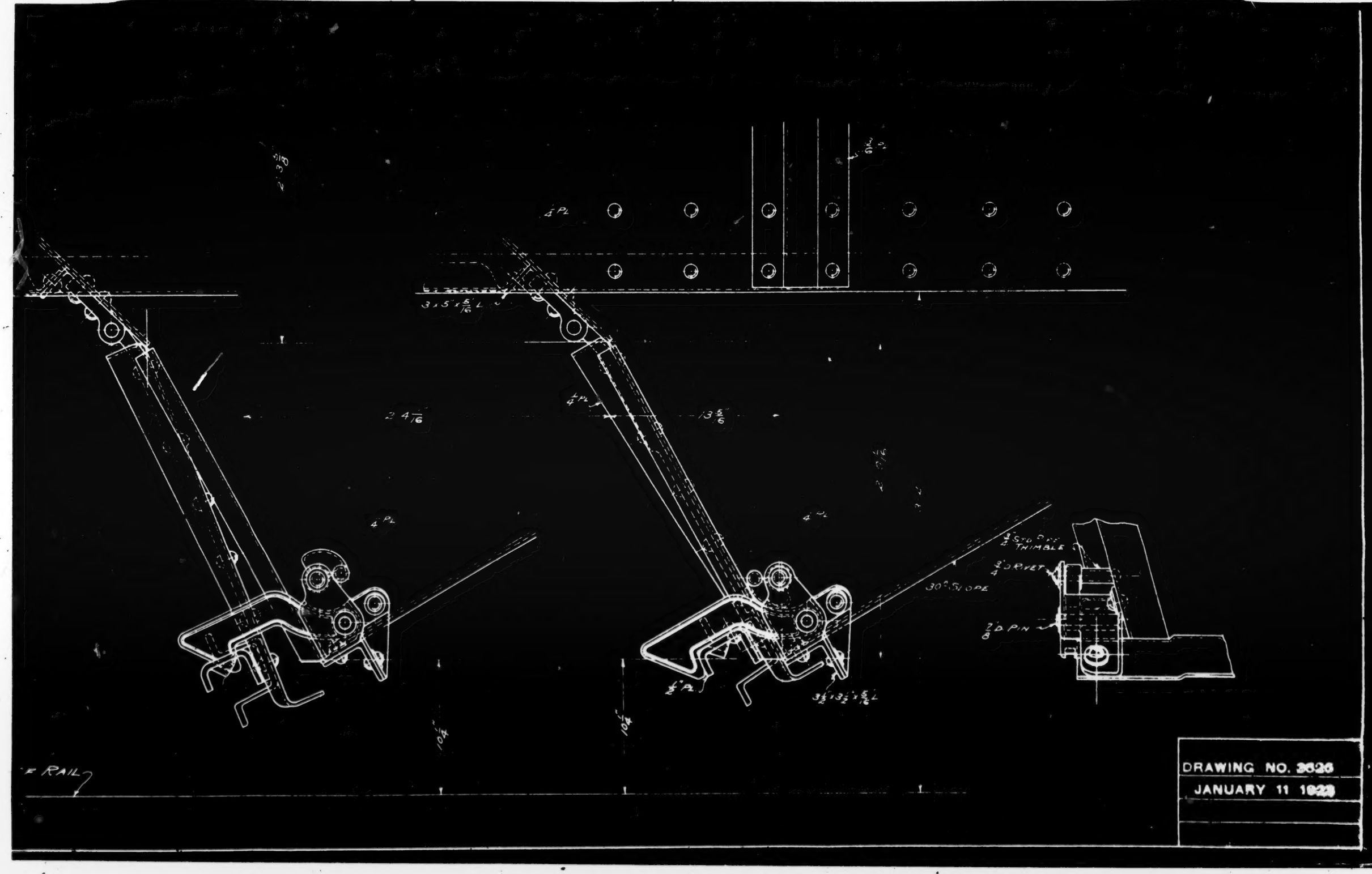
CARNEGIE STEEL SECTION #0210 OR CAMBRIA STEEL SECTION C-250, 19.75# PER FT.

TOP OF RAIL

ENTERPRISE RAILWAY
EQUIPMENT CO.
THE ROOKERY CHICAGO

"INGOLDSBY" DOOR LATCH ARRANGEMENT
FOR HOPPER CARS





DRAWING NO. 3626

JANUARY 11 1926

WINE CO. EXHIBIT H

Copy

THE WINE RAILWAY APPLIANCE CO.

Toledo, Ohio.

January 9, 1923.

Subject: B & O—Door Locks.

Mr. W. E. Wine, Pres.,
The Wine Railway Appliance Co.,
Toledo, Ohio.

Dear Sir:—

Your telegram received yesterday as follows:

"Your wire cannot change prices on door locks will give bond or any other guarantee necessary see Kadel about patent situation."

Later in the day I was advised by 'phone from Baltimore, that unless we were in position to talk price, the matter would be closed. I accordingly advise them we had made our best price and the order goes to the Enterprise Company for their door locks.

I then wired, as per confirmation attached.

Mr. C. W. Galloway, Vice President, in charge of operation, stating that they had decided to standardize the Wine two step door lock on all of their future equipment, and would place the order with us for this entire lot of cars. Mr. Emerson was present at that conference and later stated to the writer that he would consider nothing but our two step door lock, and the purchasing Agent had been advised accordingly.

The Enterprise people have been using every influence in their power to hold the matter open until they could submit a bid on their door lock, claiming that they held the original patents for this type of equipment and were anxious to get the business regardless of the price.

They submitted drawings and castings which met the approval of the Mechanical Department. The question of patents not being considered by the Mechanical Department, as that was a matter which they are not called upon to take into consideration, and they advised the Purchas-

ing Department that their approval went only for design, leaving it to him to purchase at the best price. It is, of course, believed that if we control the patents, we will have sufficient redress against the Enterprise for damages done on this order and loss of profit, etc.

There are a good many angles to this situation, which the writer would much prefer to discuss with you personally when you are here this week.

Yours very truly,

(sgd.) PETER P. BECK

PPB:MM

Copy

Nov. 27th, 1922.

SUBJECT: Proposed construction of 2,000 class N-12-G All Steel Hopper Cars Complete Wine Drop Door Locking Mechanism

Mr. W. S. Galloway, Purchasing Agent,
The Baltimore & Ohio R. R. Co.,
Baltimore, Md.

Dear Sir:—

Referring to your esteemed inquiry of the 16th instant, subject above:

1. We have quoted the Car Builders on Wine Drop Door Locks suitable for your proposed equipment $20.00 per car set, F. O. B. Toledo, Ohio, with freight allowed to the Car-builder's plants.

2. The net price to the Baltimore & Ohio RR will be $13.50 per car set F. O. B. Toledo, Ohio, with Freight allowed to carbuilder's plant. This covers our furnishing the following parts:

4 Hooks
2 Brackets—Right
2 Brackets—Left
2 Pawls—Right
2 Pawls—Left

3. Should we be favored with the order for Wine Drop Door Locks and receive same from the Carbuilder we will refund to the Baltimore & Ohio RR the difference between carbuilder's and net price, amounting to $6.50 per

car set, as soon as payment is received from the carbuilder.

Terms net cash 30 days, 1% 10 days.

Delivery can be made to suit your requirements.

Thanking you for your consideration, we are,

Yours very truly,

THE WINE RAILWAY APPLIANCE CO.

By Assistant to President.

Copy

WESTERN UNION TELEGRAM

Jan. 8, 1923 AM 6 06

UD NEW YORK NY7

THE WINE RAILWAY APPLIANCE CO.

WATER WORKS DRIVE TOLEDO OHIO

BALTIMORE AND OHIO MATTER NOW REACHED DECIDING POINT STOP MAJORITY INCLUDING MR EMERSON HAVE APPROVED TWO STEP LATCH STOP ENTERPRISE CLAIM THEY ARE NOW SUING YOU FOR INFRINGEMENT ON LOCKS IS THIS CORRECT STOP THEY ALSO CLAIM CAN FURNISH LATCH SATISFACTORY TO MECHANICAL DEPARTMENT WITHOUT INTERFERING WITH WINE PATENTS AND AGREE TO PROTECT RAILROAD STOP STATE THEY WANT ORDER FOR DOOR LOCKS AT ANY PRICE STOP UNLESS ADVISED CONTRARY I RETURN TO BALTIMORE TOMORROW EVENING STOP PLEASE WIRE ME NEW YORK MONDAY MORNING STATUS PATENT LAWSUIT ON LATCH STOP ALSO SEPARATE TELEGRAM ADVISING BEST WE CAN DO ON PRICE IF FORCED TO MEET REDUCTION

PETER P BECK.

WINE EXHIBIT I

Campbell Patent No. 1,537,050

Issued to A. Campbell May 5, 1925

35

May 5, 1925. 1,537,050

A. CAMPBELL

CAR CONSTRUCTION

Filed April 4, 1923 4 Sheets-Sheet 4

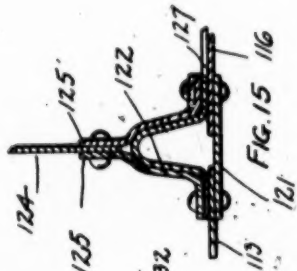


FIG. 15

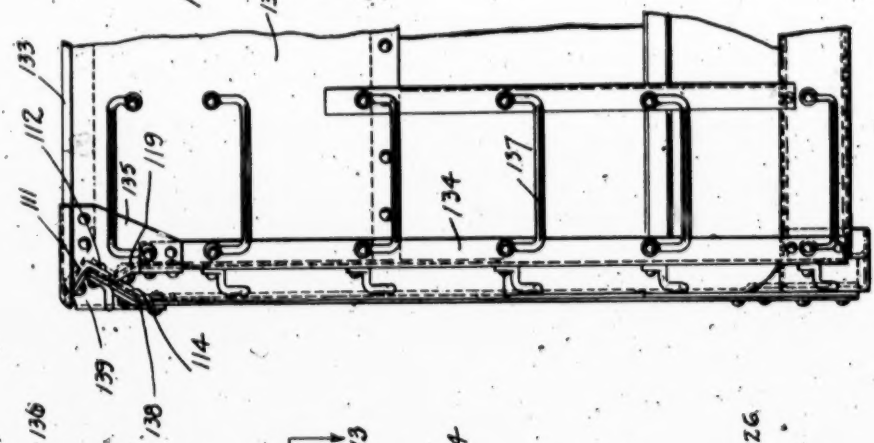


FIG. 14.

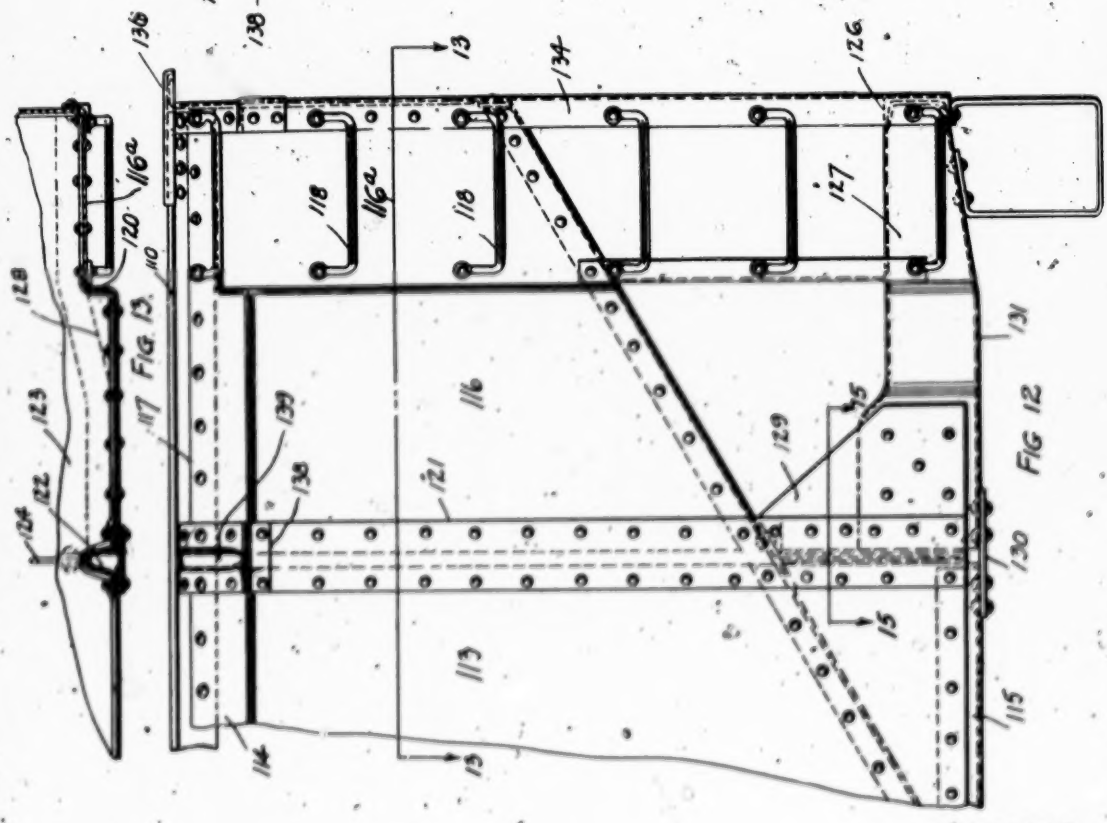


FIG. 13.

FIG 12

INVENTOR
ARGYLE CAMPBELL
BY
George I. Haight
HIS ATTORNEY

May 5, 1925. 1,537,050

A. CAMPBELL

CAR CONSTRUCTION

Filed April 4, 1923 4 Sheets-Sheet 3

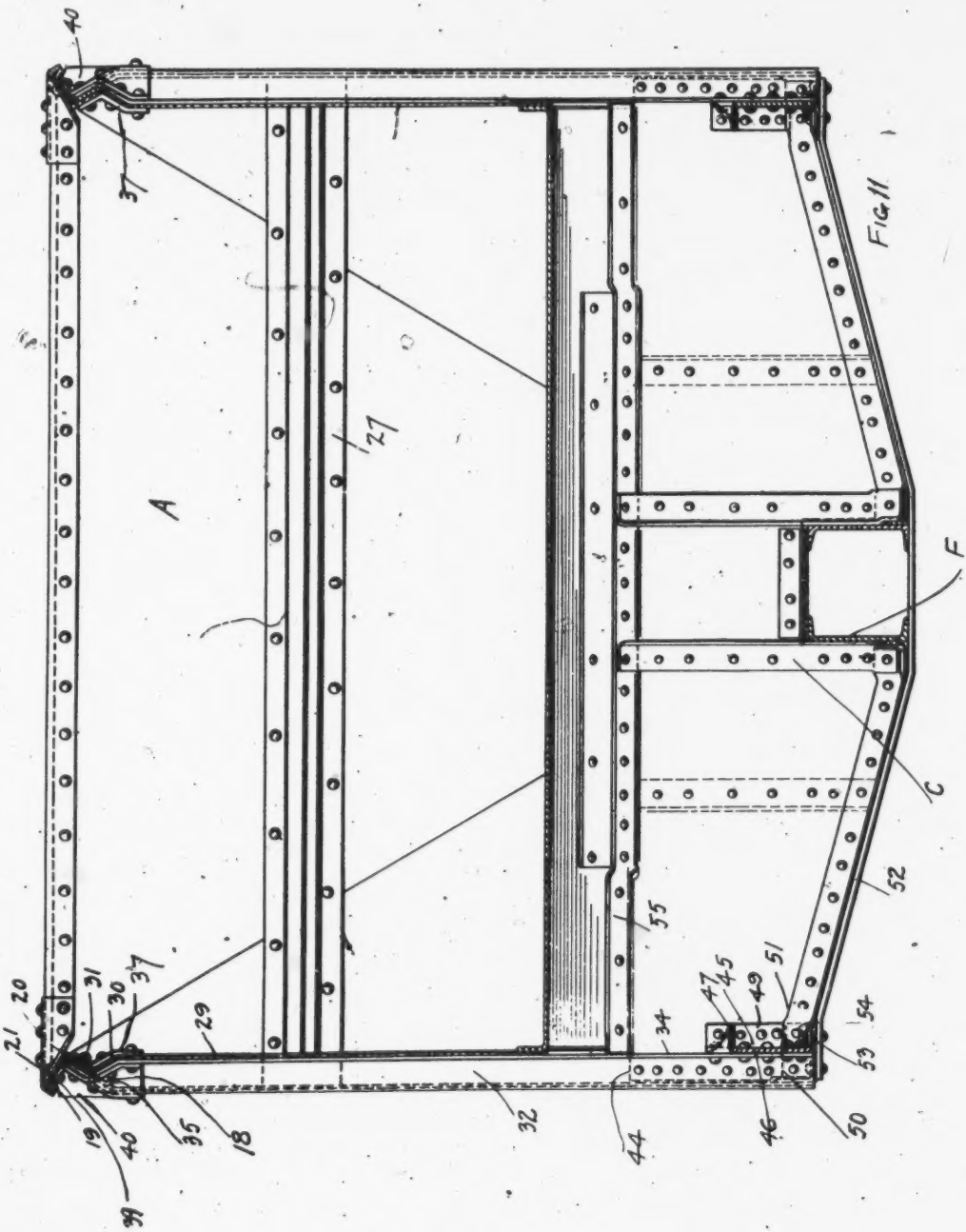


FIG 11

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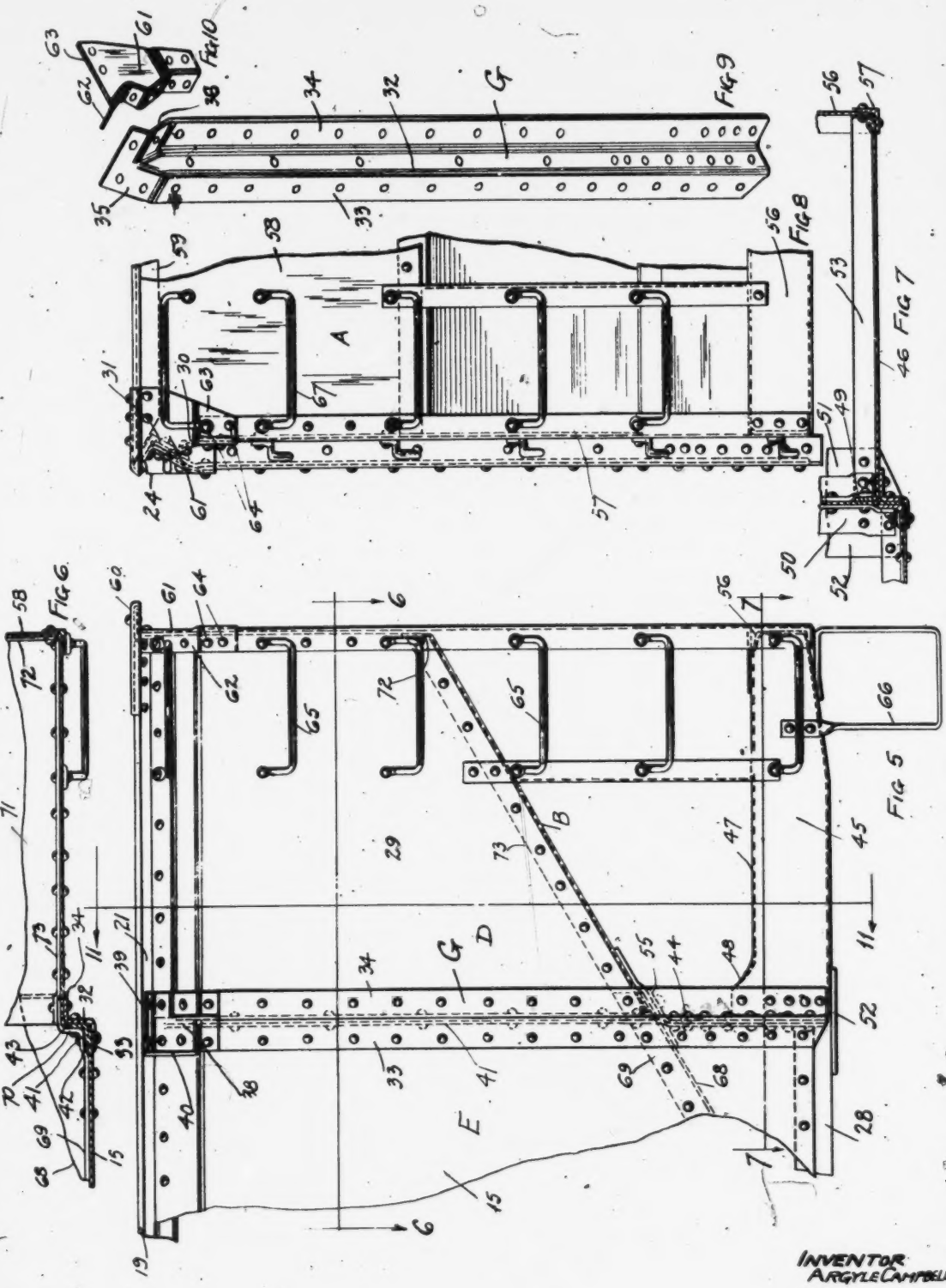

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May 5, 1925. 1,537,050

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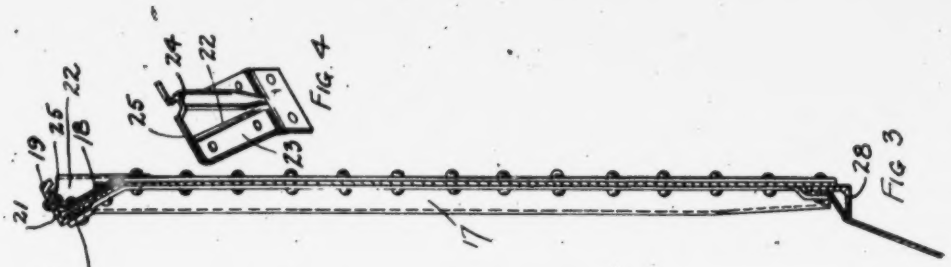
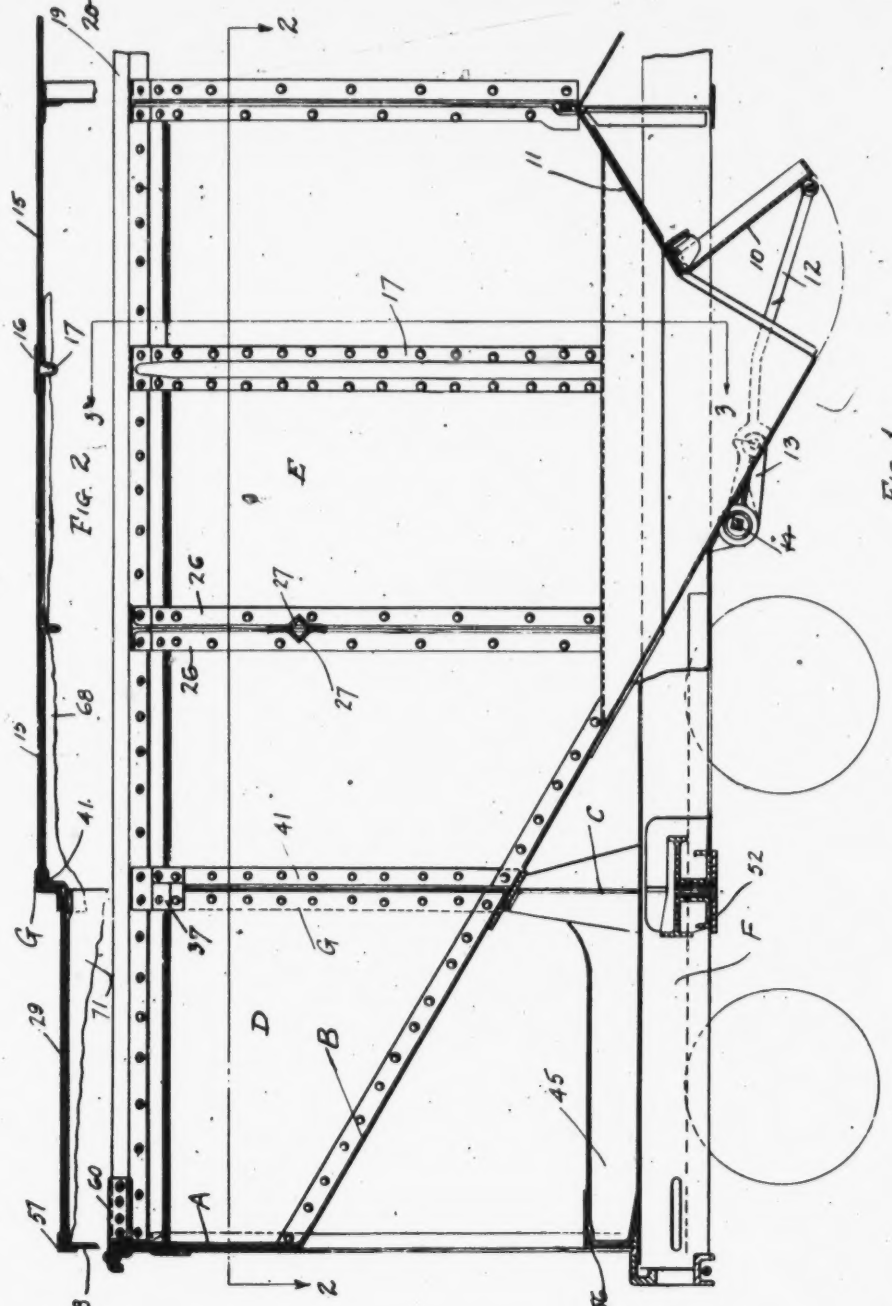
CAR CONSTRUCTION

Filed April 4, 1923 4 Sheets-Sheet 1





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UNITED STATES PATENT OFFICE.

ARGYLE CAMPBELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO ENTERPRISE RAILWAY EQUIPMENT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CAR CONSTRUCTION.

Application filed April 4, 1923. Serial No. 629,760.

To all whom it may concern:

Be it known that I, ARGYLE CAMPBELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Car Constructions, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in car construction.

One object of the invention is to provide a dump car of economical construction having maximum capacity consistent with strength and rigidity.

Another object of the invention is to provide a car having a superstructure of maximum width, wherein portions of the sides are inwardly offset for the accommodation of the side ladders within the permissible overall width of the car.

A still further object of the invention is to provide a load-carrying car having a superstructure with an open top so arranged as to obtain additional capacity when the lading is heaped, wherein the side top rail is reinforced to provide additional strength and rigidity.

It is also an object of the invention to provide improved means for connecting the bolster to the side of the car.

Other objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawings forming a part of this specification, Fig. 1 is a vertical, longitudinal, sectional view of slightly more than one half of a hopper car embodying my improvements, the section being taken partly on the longitudinal center of car and partly to one side thereof. Fig. 2 is a horizontal, longitudinal sectional view through the side of the car, corresponding substantially to a line 2—2 of Fig. 1. Fig. 3 is an enlarged, transverse, vertical sectional view of the side of the car, on the line 3—3 of Fig. 1. Fig. 4 is a detail perspective view of one of the side wall top reinforcing brackets. Fig. 5 is an enlarged side elevational view broken away, of a part of the car, showing one end of the same and illustrating the improved construction from the bolster to the end of the car. Fig. 6 is a horizontal longitudinal sectional view, corresponding substantially to the section line 6—6 of Fig. 5. Fig. 7 is a horizontal, sectional view, corresponding substantially to the section line 7—7 of Fig. 5. Fig. 8 is an end elevational view, broken away, looking from the right in Fig. 5, showing the left corner portion thereof. Fig. 9 is a detail perspective view of the bolster stake. Fig. 10 is a detail perspective view of the top, vertical corner connection. Fig. 11 is a vertical, transverse, sectional view taken through the car, corresponding substantially to the section line 11—11 of Fig. 5. Fig. 12 is a view similar to Fig. 5, showing a modified form of the invention. Fig. 13 is a horizontal, sectional view corresponding substantially to line 13—13 of Fig. 12. Fig. 14 is an end elevational view partly broken away, looking from the right in Fig. 12 showing the left corner portion of the end of the car. Fig. 15 is an enlarged horizontal, sectional view corresponding substantially to line 15—15 of Fig. 12.

Referring first to the construction illustrated in Figs. 1 to 11, in which my improvements are shown as applied to a hopper car, A denotes, broadly the end walls of the car; B the sloping end bottom walls; C the body bolster; D the side walls extending between the body bolster and the end of the car; E the side walls intermediate the bolsters; F the longitudinal center sills; and G the Z-shaped side stake at the bolster.

The sloping end bottom walls B terminate adjacent dumping openings, disposed on each side of the center sill F, and adapted to be sealed by dumping doors 10, hinged to the transversely extending ridge sheets 11. Suitable operating mechanism is provided for the doors, which may consist of a link 12 and crank arm 13 actuated by a transversely extending shaft 14.

My present invention consists more particularly in the superstructure of the car. The side walls E of the car, intermediate the body bolsters, are spaced apart the maximum permissible distance allowed in service, and are preferably formed of a plurality of sheet metal plates 15, the joints of said plates 15 being covered by narrow plates 16, so that the exterior of the side walls intermediate the bolsters of the car presents a substantially flat and unbroken surface. Stakes 17, preferably pressed out of sheet metal to present a substantially U-shaped section, are disposed inside the car and are

preferably disposed at the joint between the various sections of plates forming the sides. Along their top edges, the side wall plates 15 are bent inwardly and upwardly, as shown at 18. Secured to the side plates 15 along their inwardly bent upper edges are bulb angles 19, each having a flange 20 to the upperside of which the inturned edge 18 of the corresponding side wall is riveted and a flange 21 sloping upwardly and outwardly. On the exterior of the car wall, and preferably adjacent to the inside stakes, reinforcing brackets 22 are provided. The brackets 22 are provided with flanges 23 by which they are secured to the car wall. Each of the brackets 22 are formed with a vertically extending corrugation 24 and is further provided with a flange 25 secured to the upper flange 21 of the bulb angle 19. At suitable intervals angles 26—26 are placed back to back and secured to the interior of the side wall of the car and transversely extending tie members 27—27 extend between and are secured to the angle members at opposite sides of the car. The lower margin of each side wall is reinforced by a longitudinally extending angle member 28, extending from bolster to bolster.

The car is formed of restricted width at each end thereof, from the bolster outwardly to the end of the car, primarily, in order to provide the necessary space for the safety appliances and the end portions D of the side walls are each, preferably, formed of a single plate 29 bent outwardly and upwardly at the upper edge thereof, as indicated at 30, and then upwardly and inwardly as indicated at 31, and suitably secured to the downwardly extending flange 20 of the bulb angle 19, it being understood that the said bulb angle 19 extends throughout the length of the car. The space, between the sections D and E of each side wall of the car is bridged transversely by the vertically extending stake G, preferably, of Z shape section, with the web 32 thereof disposed in a transverse plane and the flanges 33 and 34 secured respectively to the side wall sections E and D, and preferably disposed on the outer face of the car side wall. The upper end of the stake G is constructed to conform to the shape of the plates forming the respective side wall sections D and E, the flange 33 being continued upwardly and turned inwardly as indicated at 35 and flange 34 being continued upwardly and bent outwardly as indicated at 36 and thereafter merging with portion 35. On the interior of the car, the respective portions of the side wall are connected by a plate 37, which is secured to the top rail bulb angle 19 and pressed to shape to conform to the offset construction of the side. On the exterior of the stake G, at the upper part thereof, a reinforcing bracket 38 is secured to the side of the car and formed with an upwardly and outwardly extending flange 39 secured to the underside of the upper flange 21 of the bulb angle 19. At one side of the bracket a stiffening flange 40 is formed integrally therewith providing a construction of great rigidity and serving to brace the upper flange 21 of the bulb angle 19 against downward bending.

The stake G is reinforced by a vertically extending angle shaped member 41 disposed on the inside of the car and having one flange 42 secured to the inside face of the plate 15, forming a portion of the wall E, and having the flange 43 opposite thereto secured to the web 32 of the stake member. The angle member 41 is offset sufficiently to pass over and overlap the bolster web plate 44, which extends transversely from side to side of the car and between the web 32 of the stake and the said flange 43 of the angle 41, the angle member, web plate and stake being rigidly united by rivets 44. Extending outwardly from the ends of the bolster C to the end of the car are the horizontally extending brace members 45. The braces are preferably formed of channel shape and the web 46 of each riveted directly to the flange 34 of the stake G, and in order to provide additional strength, the upper flange 47 of the brace is turned upwardly in alinement with the web 46 as shown at 48 and also riveted to the flange 34. The brace is also formed with a flange 49, at the end thereof which is riveted to the bolster web plate 44. The bolster bottom chord consists of bottom angles 50 and 51 and bottom cover plates 52. Bottom cover plate 52 is extended to connect with the horizontal flange of the side wall bottom angle 28 and also with the lower flange 53 of the brace 45. Angle 50 is extended outwardly and has the horizontal flange thereof riveted to the horizontal flange of the side wall bottom angle 28. The vertical flange of the said bolster bottom angle 50 is offset over the flange 43 of the vertical angle 41 and riveted thereto, and to the bolster web plate 44 and also to the web 32 of the stake G. The horizontal flange of bolster bottom angle 51 is offset sufficiently to permit the same to overlap the horizontal flange 53 of the brace 45 and is riveted thereto and to the bolster bottom plate 52. The vertical flange of the said angle 51 is also offset to permit the same to overlap the vertical end flange 49 of the brace 45, the securing rivet 54 passing through the said angle 51, the flange 49 of the brace 45, the bolster web plate 44 and the vertical flange of the opposite bolster bottom angle 50. In this manner a most effective connection between the bolster and the side of the car is secured. The bolster web plate 44 is preferably formed to extend

across the car in one piece, thereby providing a direct connection between the opposite sides of the car, but it will be understood that it may be formed in sections. The said plate 44 is bent upwardly at 55 and secured to the underside of the sloping end floor B.

The brace 45 is extended to the end of the car and is there connected directly to the end sill 56; each of the corner posts 57, preferably, consists of an angle which extends upwardly from the end sill to within a short distance of the top of the car, terminating at the bend 30 in the side plate 29. The vertical end wall A is formed of a plate 58 reinforced at the top by a bulb angle 59, and a horizontal connection 60 unites the same with the side top member 19. A vertically disposed connection 61 connects the vertical, side and end walls at the upper part of each corner of the car. Said connection has a wall 62 of irregular shape conforming to the shape of the side wall formed by bends 30 and 31, and also a wall 63 overlying the end plate 58, the said walls of the connection are each extended downwardly and overlie the corner angle 57 and are secured thereto by a plurality of rivets 64.

In the recess provided at each end of the car by the restricted width thereof, the side ladders formed by the ladder treads 65 and sill steps 66, are disposed. Ladder treads 67 are also provided on the end of the car in the usual manner.

The sloping end floor B of the car is preferably formed in a plurality of sections, being divided at the bolster. The lower portion thereof consisting of a plate 68, which is flanged upwardly at 69 and secured to the side of the car, said flange being made to conform to the offset construction of the car as indicated at 70. The upper portion of the sloping floor B consists of a plate 71 flanged at 72 and 73 and riveted to the end plate 58 and side plate 29, respectively. Said flange 73 is offset and overlaps the offset portion 70 of the lower portion of the sloping floor.

It will be evident that the vertical stakes G arranged as hereinbefore described provide vertical stiffening members, at the bolsters of great strength, resisting outward bulging of the car sides, which do not impede the flow of the discharge material from the upper portion of the sloping floor towards the discharge opening.

In Figs. 12 to 15 inclusive, a modified form of side wall construction is shown, wherein the recess for the accommodation of the side ladder treads is constructed independently of the bolster.

In said construction 110 denotes the side top bulb rail having flange 111 sloping upwardly and outwardly and a flange 112 sloping downwardly and outwardly therefrom. The side wall intermediate the body bolsters consists of a plate 113, bent inwardly and upwardly at 114 and secured to flange 112 of the top rail. The lower margin of the plate 113 is reinforced by angle 115. The side plate 116 extending from the bolster to the end of the car is bent upwardly and inwardly at 117, preferably in the same plane as plate 113, and secured to the top rail. Near the end of the car a portion of the side 116 is offset as indicated at 116^a thereby presenting a panel, spaced from the main body of the plate and within the recess formed thereby are disposed the side ladder treads 118. The panel 116^a is preferably produced by deflecting the main body of the plate inwardly, by forming a longitudinal inwardly and downwardly extending bend 119 and a vertically extending bend 120. At the bolster the respective side plates are united by a splice plate 121 disposed on the outside face of the car side wall, and a stake 122 on the inner side thereof. The stake 122 is preferably in the form of a pressed plate extending through the end sloping floor 123, and is connected to the bolster web plate 124 by means of plates 125 which are disposed on either side thereof.

Extending from the end sill 126 to the body bolster is a brace 127 which is bent as indicated at 128 to provide the necessary clearance for the side ladder. Said brace 127 is connected to the side directly by means of a gusset 129. The bolster bottom plate 130 is extended outwardly and secured to the lower flange 131 of the brace 127 and also to the bottom angle 115 of the side wall.

The end wall of the car consists of a sheet metal plate 132 reinforced at the top by bulb angle 133. Connection between the end wall and side wall is made by means of corner post angle 134, vertical top corner connection 135 and horizontally extending top connection 136. The usual ladder treads 137 are provided on the end of the car as shown. A reinforcing bracket 138 having a stiffening corrugation 139 pressed therein is secured to the top bulb rail and serves to restrain the top of the car against outward bulging.

While I have shown and described my improved construction in connection with a car of the hopper discharge type, it will be understood that the same is not limited thereto, but may be applied to other types of cars, wherever it is desired to utilize the full permissible clearance in the construction of railway cars for the purpose of securing increased load-carrying capacity.

I have herein shown and described what I now consider the preferred manner of carrying out my invention, but the same is merely illustrative, and I contemplate all changes and modifications that come within the scope of the claims appended hereto.

What I claim is:

1. In a railway car, the combination with

a side sheet having the top edge thereof bent inwardly and upwardly; of a top rail angle secured to said inwardly bent top edge of the side sheet, the free flange portion of said angle extending upwardly and outwardly; and a bracket for bracing said flange.

2. In a railway car, the combination with a side wall including a side sheet having the top portion thereof bent inwardly and upwardly; of a top rail angle secured to said inwardly bent top portion of the side sheet, said rail angle having a portion extending upwardly and outwardly, and a bracket having angularly disposed flanges, one of said flanges being secured to the said angle and the other flange being secured to the side sheet, said bracket being provided with a reinforcing corrugation.

3. In a car, the combination with a side wall; of stakes on the inner sides thereof, the top edges of said side wall being bent inwardly and upwardly; a longitudinally extending top rail secured to said inwardly bent top edge of the side wall, said rail having upper and lower flanges; and reinforcing members on the outer side of said wall connecting the upper flange of the rail with the lower flange thereof.

4. In a car, the combination with end walls; of side walls, said side walls being composed of a plurality of sheets, having their upper ends bent outwardly and upwardly and thence inwardly and upwardly; and a flanged connecting member having one flange thereof conforming to the shape of the side wall and secured thereto and another flange overlying the end wall and secured thereto.

5. In a railway car, the combination with a side sheet comprising a main portion and an inwardly offset portion, the upper end of the said main portion being bent inwardly and upwardly, said offset portion being provided with an upper end having a part thereof outwardly and upperwardly bent, and a part beyond said bent portion merging with said upper bent end of said main side portion; of a top rail angle secured to said inwardly bent upper end of the main wall portion and also secured to the part of the offset portion merging therewith.

6. In a railway car, the combination with top rail members at opposite sides of the car, said rail members extending from end to end thereof in a straight line; of a pair of opposite side plates at each end of the car, each of said plates being secured to the corresponding top rail and having portions thereof lying in different vertical planes to thereby restrict the width of the car at the opposite ends; a sloping floor at each end of the car, said floor being restricted in width adjacent the corresponding end of the car and being secured to the respective side plates; and a side stake and a corner post secured to each plate, each of said stakes also being secured to the corresponding top rail.

7. In a railway car, including body bolsters and sills, the combination with side walls, each including a unitary plate section at one end of the car, each of said plate sections having a portion thereof offset with reference to the body of the plate to provide clearance for a side ladder, said offset portion being connected to the body of the plate by vertically and horizontally disposed portions; of a brace at each side of the car extending from each body bolster to the corresponding end sill, each of said braces being offset to correspond with the respective plate sections, whereby to provide clearance for the corresponding side ladder.

8. In a car side, the combination with a top rail extending from end to end of the car in a straight line; of a unitary plate section, said plate section having a portion thereof offset to provide walls lying in different planes, said offset walls merging in a common plane along one edge of the plate, said edge being secured to the top rail member.

9. In a car side, the combination with an integral plate member having an edge portion lying in a single plane, a section of said plate inwardly of said edge being offset laterally with reference to the remainder of the plate to provide wall portions lying in different planes; of a top rail secured to said edge of the plate.

10. In a car having the ends formed of lesser width than the central portion thereof, said ends having substantially vertically disposed straight corner posts, the combination with side top rail members extending longitudinally of the car and substantially in alinement with the aforesaid corner posts and secured thereto; of a plate secured respectively to the top rail member and corner post, said plate having horizontal and vertical offsets formed therein whereby the main section of the plate is disposed outwardly of the rest of the plate to secure increased width of the car; and ladder rungs mounted on the car between the aforesaid vertical offset and the end of the car and within the plane of said widened portion of the car.

11. In a dump car, the combination with end walls; of vertically disposed side walls, each of said side walls having the major portion thereof lying in one plane, a longitudinally extending marginal top portion disposed inwardly of the plane of said major portion, and a vertically extending end marginal portion disposed in a plane inwardly of the plane of said major portion, said end marginal portion being united to said major

portion by a transversely disposed section; and a sloping floor, said floor, end and side walls together defining a hopper structure.

12. In a car, the combination with end walls; of vertically disposed side walls, each of said side walls having the major portion thereof lying in one plane, a longitudinally extending marginal top portion disposed inwardly of the plane of said major portion, and a vertically extending end marginal portion disposed in a plane inwardly of the plane of said major portion, said end marginal portion being united to said major portion by a transversely disposed section, the extreme upper edges of said top marginal portion and end marginal portion being disposed in alinement; a continuous top rail extending in a straight line from end to end of the car and secured to the upper edge of the top and end marginal portions of each side wall of the car; and a brace secured to each side wall at said vertically extending end marginal portion, said brace extending from the bolster at the corresponding end of the car to the end of the car and having a portion thereof inwardly offset.

13. In a dump car having end walls and body bolster, each side wall extending in the same vertical plane from a point approximately midway between the end of the car and the adjacent bolster to a corresponding point at the other end of the car, said side wall, from the point first mentioned to the adjacent end of the car being inwardly offset a sufficient amount to accommodate ladder rungs within the plane of the main portion of the side wall; and stakes on the inner sides of the side walls, said side walls being inwardly offset along their upper edges and having a top rail member secured thereto.

In witness that I claim the foregoing I have hereunto subscribed my name this 17th day of March 1923.

ARGYLE CAMPBELL.

Witnesses:
FRANCES SAVAGE,
HARRIETTE M. DEAMER.

May 5, 1925. 1,537,051

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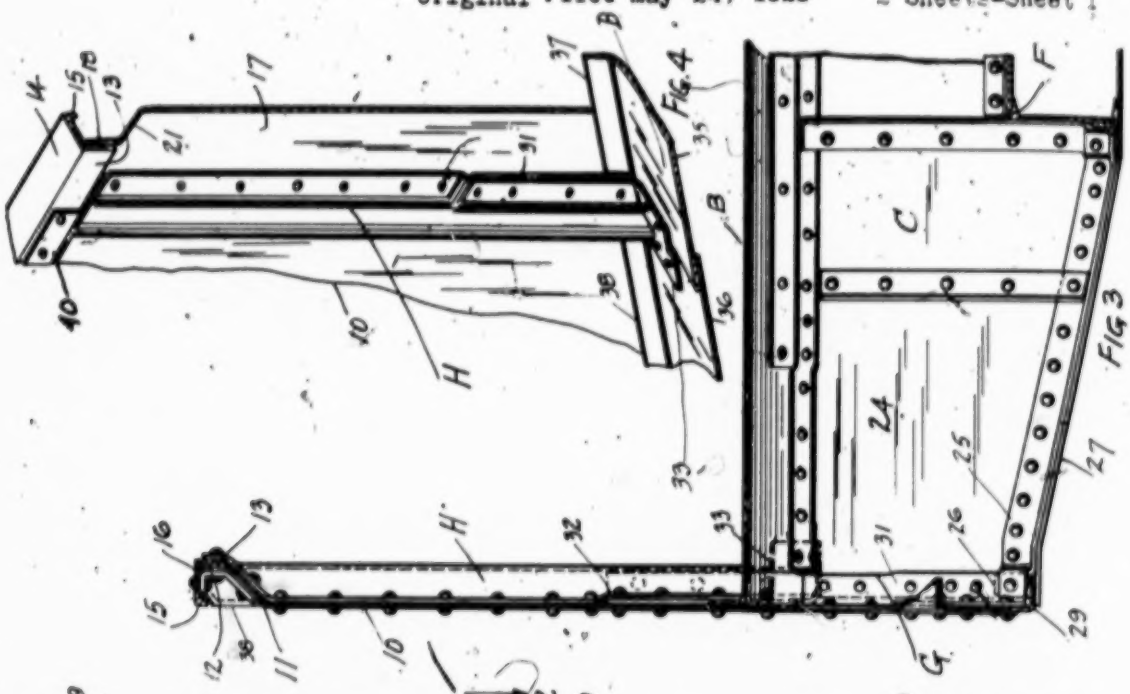
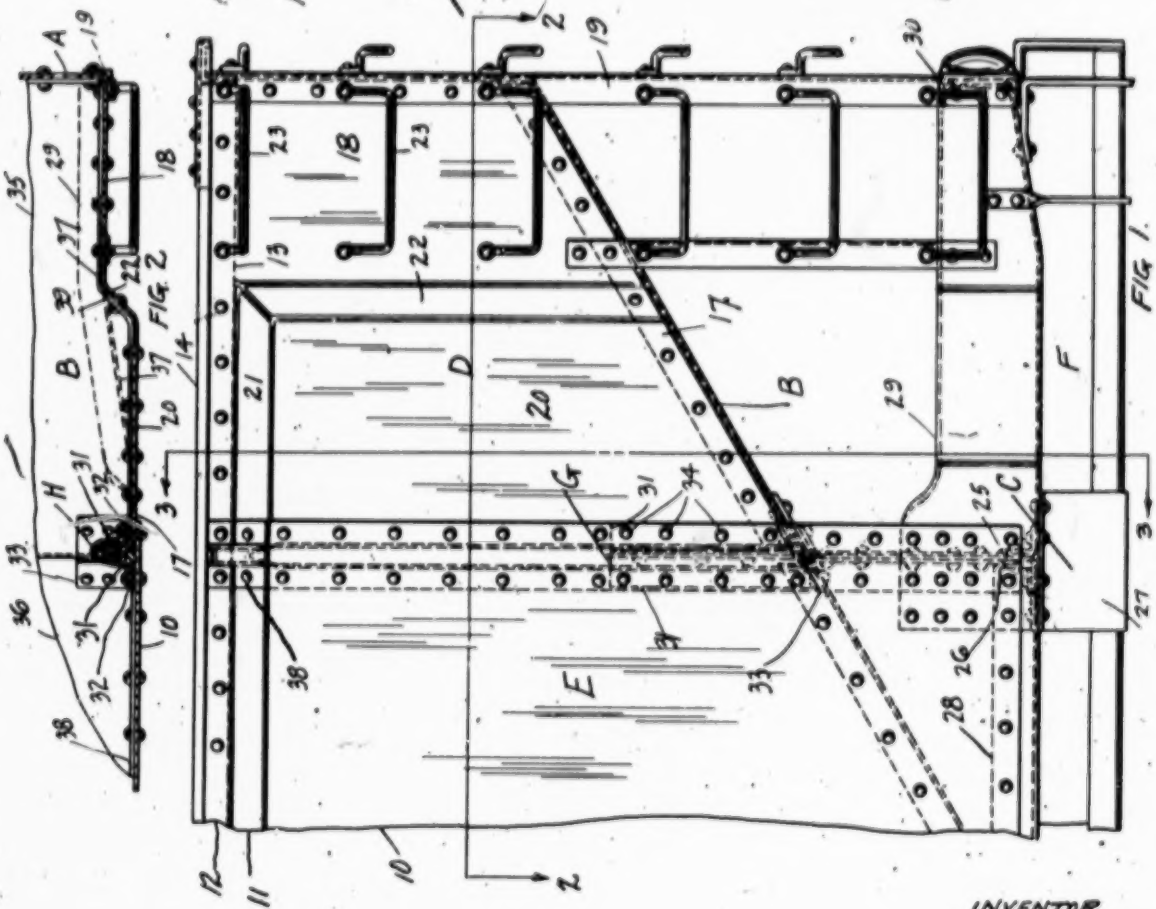
RAILWAY CAR CONSTRUCTION

Original Filed May 24, 1923 2 Sheets-Sheet 1





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RAILWAY CAR CONSTRUCTION

Original Filed May 24, 1923 2 Sheets-Sheet 2

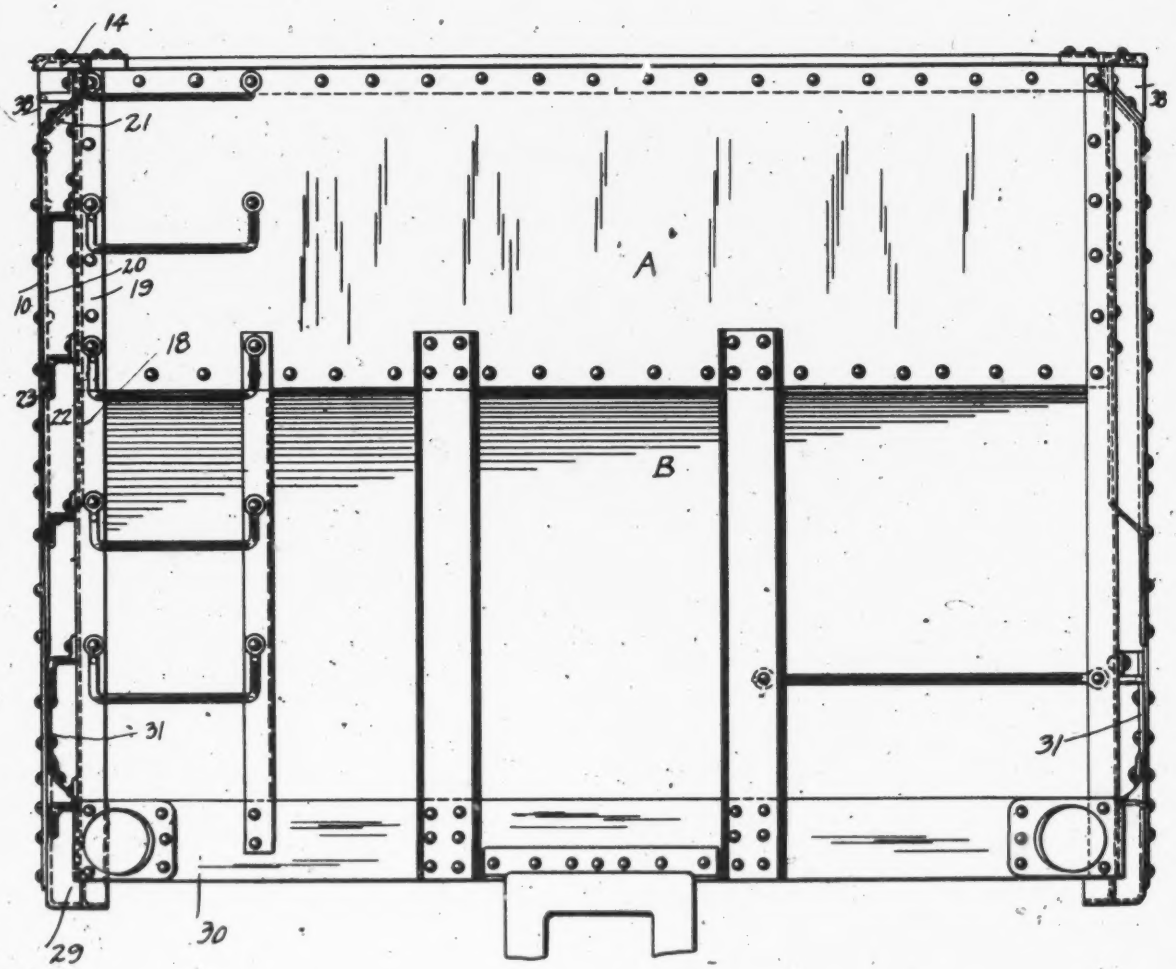

FIG. 5

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ARGYLE CAMPBELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO ENTERPRISE RAILWAY EQUIPMENT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

RAILWAY-CAR CONSTRUCTION.

Application filed May 24, 1923, Serial No. 641,121. Renewed January 31, 1925.

To all whom it may concern:

Be it known that I, ARGYLE CAMPBELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Railway-Car Constructions, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in railway car construction.

One object of my invention is to provide a car of the dumping type having the maximum over-all width possible under given road clearance and the maximum length of the car consistent with the application, to the outer side of the car, of the usual safety appliances required by law to the end that the maximum possible capacity is obtained for a car having a maximum possible width and given height.

Another object of the invention is to provide an improved and simple connection between the bolster and sides of the car.

My invention further resides in certain details of construction as will more clearly appear from the description and claims hereinafter following.

In the drawings forming a part of this specification, Figure 1 is a broken side elevational view of part of a hopper car, showing one end of the same and illustrating the improved construction from the end of the car to a point inwardly of the bolster. Figure 2 is a horizontal longitudinal sectional view, broken away, corresponding substantially to the section line 2—2 of Fig. 1. Figure 3 is a transverse sectional view taken through the car and illustrating substantially one-half thereof, said section corresponding substantially to the section line 3—3 of Fig. 1. Figure 4 is a fragmentary perspective view of a portion of the car as viewed from the interior thereof and illustrating the bolster stake. Figure 5 is an end elevational view of the car as shown in Fig. 1.

My improved construction is shown, by way of illustration, as applied to a hopper car, and in said drawings, A denotes, broadly, the end wall of the car; B the sloping end bottom wall; C the body bolster; D the portion of the side wall extending from the body bolster to the end of the car; E the portion of the side wall intermediate the bolsters; F the longitudinal center sills; G the body bolster stub stakes; and H the hollow bolster stake. While I have shown only one end of the car it will be understood that the two ends of the car are of substantially the same construction.

My present invention consists more particularly in the superstructure of the car and is particularly applicable to cars of the type shown in my pending application, Serial No. 585,432, filed April 4th, 1923, and of which this application is a continuation in part. The portions E of the side walls of the car intermediate the body bolsters, are spaced apart the maximum permissible distance allowed in service and, preferably, each consists of sheet metal plates 10, preferably inclined upwardly and inwardly near the tops thereof as shown at 11 and thence upwardly as shown at 12 and there secured to the vertical flange 13 of a longitudinally extending top rail member 14. The latter preferably consists of a bulb angle disposed with the bulb 15 thereof on the outstanding edge of the flange 16 which is so disposed as to be in a horizontal plane.

Each end portion or sheet D of each side wall consists of a sheet metal plate 17 having the major or main section 20 thereof, extending in the same plane as the plane of the intermediate portion E of the side wall. The sheet 17, near the extreme end of the car is offset inwardly to provide the offset section 18 for the purpose of accommodating the usual ladder rungs 23 within the permissible overall width of the car. The inwardly offset section 18 is secured along its top edge to the top rail member 14, the sheet being also indented along its upper edge above the main section 20 to the same plane as the section 18, as clearly shown in Figs. 1 and 3. The inclined sections between the main outermost section 20 and the inwardly offset upper edge is indicated at 21, and 22 indicates the offset between the main section 20 and section 18, the former offset extending horizontally and the latter vertically. It will also be noted that the vertical edge of the section 18 is connected to the corner post angle 19. Connection between the sheet 17 and the adjacent plate 10 is effected by extending

the vertical edge of the latter beyond the bolster to overlie the plate 17 and to which it is riveted.

Extending transversely of the car beneath each sloping end floor is the body bolster C which, preferably, includes a web plate 24 extending across the plane of the center sill F and bent near the top thereof and secured to the sloping end floor B. The bottom chord of the bolster consists of bottom angles 25 and 26, disposed on opposite sides of the center sills, and bottom cover plate 27 extending from side to side of the car, said bottom plate being secured to side wall bottom angle 28 and to the brace 29 which extends from the bolster to the end sill 30, of the car.

The principal means of connection between the bolster and the side wall of the car consist of stub stakes G formed of angles 31—31 secured to either side of the bolster web plate 24 and extended upwardly through the sloping floor of the car for a limited distance and terminating an appreciable distance below the top of the car. Said portion of the stub stakes projecting into the car is contained within the hollow stake H which is preferably formed of sheet metal pressed to a U shape with flanges 32—32 to either side of the U whereby connection is made between the stake and the side of the car, the said stake extending from the sloping floor of the car to the top rail bulb member and suitably secured thereto by offset flange as indicated at 40 in Fig. 4. The lower portion of the stake H is bent at an angle at 33 to form a knee joint and conform to the sloping floor and secured thereto, thus covering the perforation made in the sloping floor for the stub stakes to pass therethrough. Furthermore, the knee joint in the stake forms a secured footing for the stake which insures a very rigid construction for the side and effectively braces the same against inward bending when the car is unloaded by tipping the same on its side in a dumping machine. Stake H and the stub stakes overlap and extend co-extensively with each other for a limited distance, the rivets 34 passing through both stakes. Consequently, the weakness which would ordinarily be present in a stake made of a plurality of sections is entirely compensated for.

The sloping floor B is preferably made in sections, consisting of upper section 35 and lower section 36 and these sections overlap and are jointed over the bolster as shown in Fig. 4, the sloping floor sections of the car being respectively flanged upwardly along their edges at 37 and 38 and riveted to the side walls of the car. Upper section 35 is formed with an offset at 39 (see Fig. 2) to conform to the offset section of the end portion of the side wall. The knee bracket portion 33 of the stake H also extends over the overlapping portion of the floor plates 35 and 36 thereby obviating the necessity of forming a complicated connection between the side wall of the car and the said overlapping plates where the stub stakes 31 intersect the same.

The brace 29 is extended to the end of the car and is there connected directly to the end sill 30 and to the corner post angle 19, the said brace 29 being offset as indicated at 37 for the purpose of providing the necessary clearance for the lower rungs of the side ladder.

The corner posts 19 rise vertically from the end sills and are preferably straight, defining the limits of the side and end walls of the car.

Brackets 38 are disposed at intervals along the side of the car and assist to brace the top rail member and prevent the same from bending to the side. Each bracket 38 is preferably disposed adjacent a side stake and connected thereto.

From the preceding description considered in connection with the drawing, it will be noted that the planes of the portions E of each side wall are continued beyond the vertical line of the bolster to a point closely adjacent the ladder rungs so that the maximum capacity is made available for the car within the permissible limits of road clearance. Stated in another manner, the only loss in capacity over a car having the side wall continued literally from end corner post to end corner post, all in the outside plane of the side portions E, is that resulting from the inwardly offsetting of the sections 18 and as to these, it will be noted that, on account of the sloping end hopper sheets and general conformation of the car, the indented portions are of the minimum vertical height.

I have shown and described my improved invention in connection with a hopper car but it will be understood that the same is not limited thereto.

I claim:—

1. In a dump car having a sloping floor, the combination with a side wall; of a body bolster extending transversely of the car beneath the sloping floor; and a plurality of angles arranged in pairs at each end of the bolster, said angles intersecting the sloping floor, each angle of each of said pairs having one of its flanges inwardly disposed and secured to the bolster, the remaining flanges of each pair of angles being disposed in substantial alinement, in the plane of the side wall of the car and secured thereto.

2. In a dump car having a sloping end floor, the combination with a side wall; of a body bolster extending transversely of the car beneath the sloping end floor; of a stake secured to the body bolster and extending

through the sloping end floor and secured to the car side wall; and a second stake disposed entirely above the sloping floor and secured to the upper portion of said first named stake and to the side wall.

3. In a dump car having a sloping end floor, the combination with a side wall; of a body bolster extending transversely of the car beneath the sloping end floor; of a stub stake secured to the body bolster and passing through the sloping end floor and extending above the same for a limited distance and secured to the side wall; and another stake disposed above the sloping floor and secured to the aforesaid stub stake and extending upwardly above the same and secured to the side wall.

4. In a dump car, the combination with a side wall; of a hollow stake secured thereto; and a stake extending within said hollow stake and secured thereto.

5. In a dump car having a sloping end floor and a side wall having the upper margin thereof reinforced by a top rail member, the combination with a hollow stake disposed above the sloping floor and secured thereto and to the top rail member, of a stake extending through the sloping end floor and within the aforesaid hollow stake.

6. In a dump car having a sloping end floor and a body bolster, the combination with a side wall including a side top rail member and a plate inclined downwardly and outwardly from the top rail member in order to provide a car of increased width; of a hollow stake disposed above the sloping end floor of the car and secured thereto and to the top rail member; and a stake secured to the body bolster and extending through the sloping end floor and within the aforesaid hollow stake.

7. In a dump car having a sloping end floor, the combination with a car side wall, of a stake secured to the inner face of the side wall and a knee joint between said stake and sloping end floor.

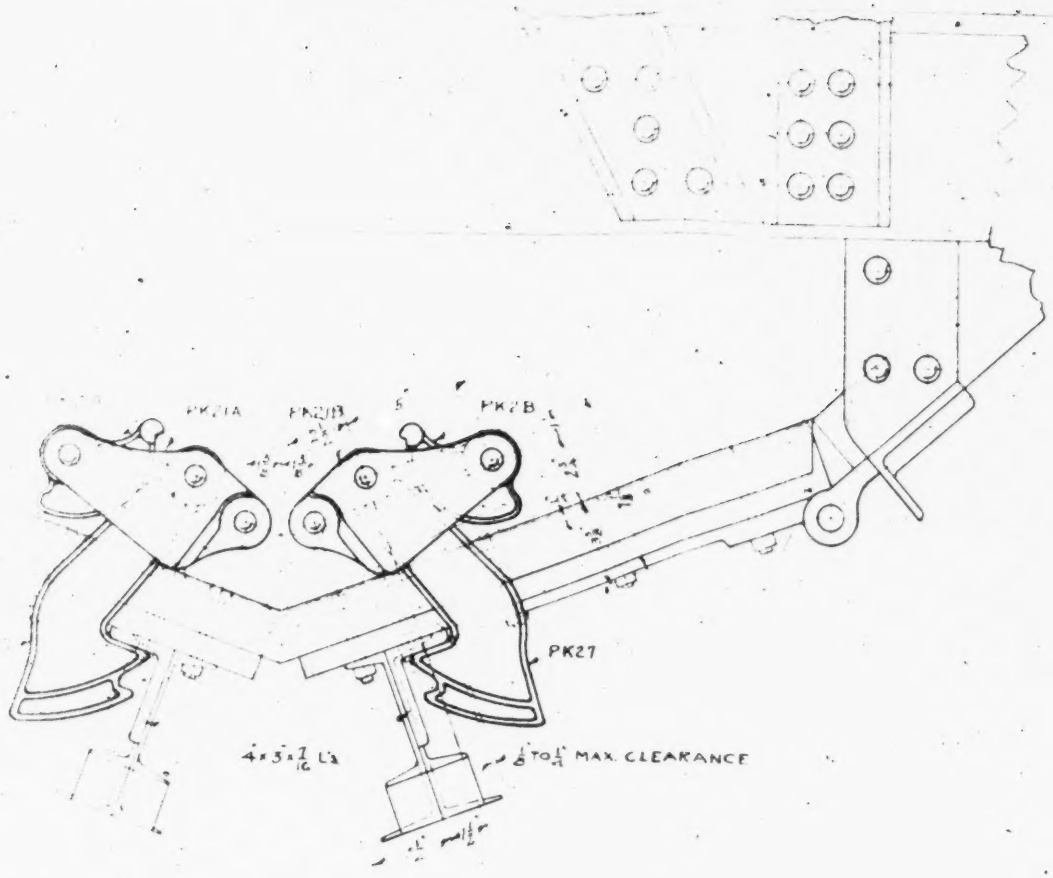
8. In a dump car, the combination with a side wall and a body bolster extending transversely of the car; of a sloping end floor secured to the side wall of the car and formed of a plurality of sections joined at the bolster and overlapping; a stake rising from the end of the bolster through the said sloping floor; and a covering for the said stake secured to the side wall of the car and the sloping floor.

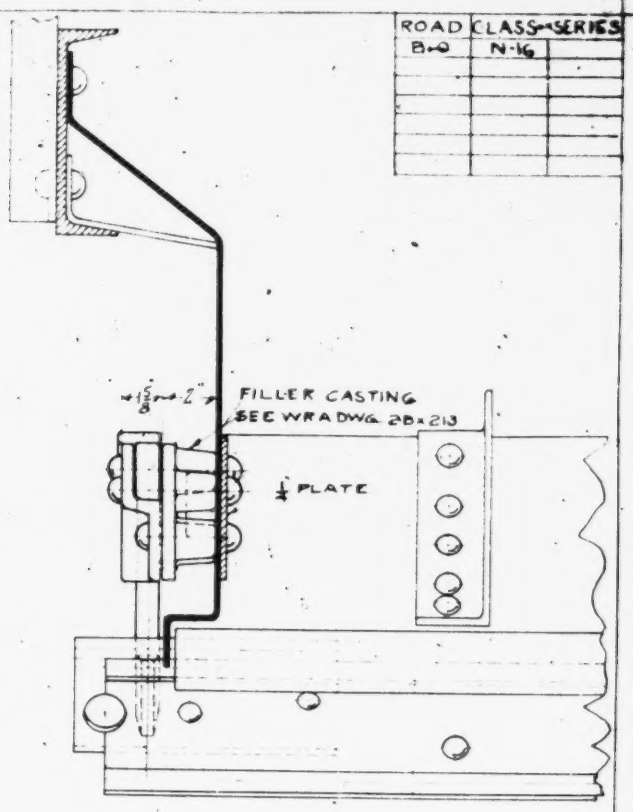
9. In a dump car, the combination with the end wall; of a side wall having the top thereof reinforced with a longitudinally extending member of angular section having one flange thereof substantially horizontally disposed and the adjacent flange thereto vertically disposed; a corner post defining the limits of the aforesaid respective side and end walls; a plate included in the side wall of the car and having a section secured to the aforesaid top member and corner post and extending from one to the other in the same plane; and ladder rungs secured to the aforesaid section, said plate having the main section thereof offset adjacent the ladder rungs and adjacent the side top member thereby presenting a car of increased width throughout the length of the latter offset.

In witness that I claim the foregoing I have hereunto subscribed my name May, 1923.

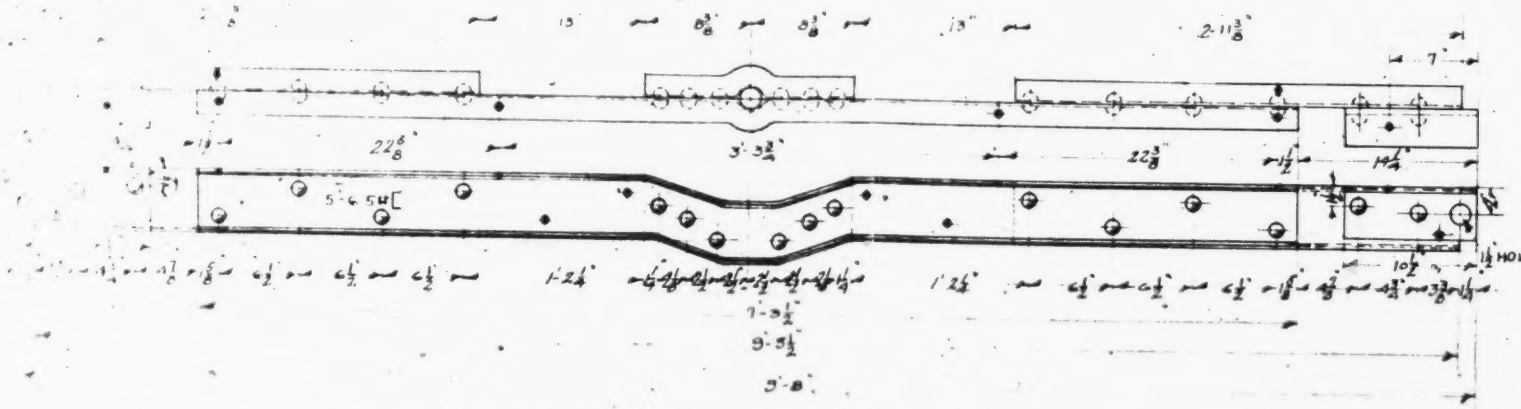
ARGYLE CAMPBELL.

Witnesses:
GEO. B. DOREY,
I. E. DRAKE.





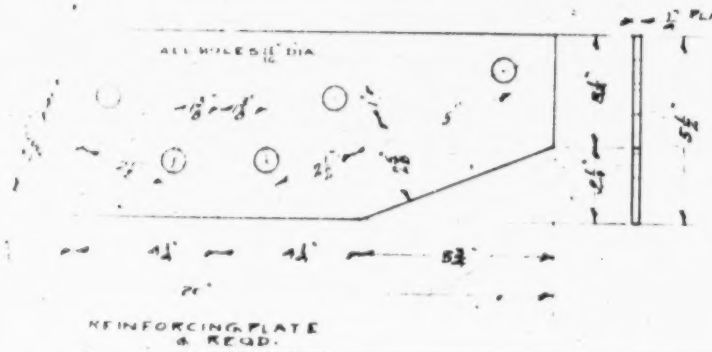
ROAD CLASS	SERIES
B-O	N-16

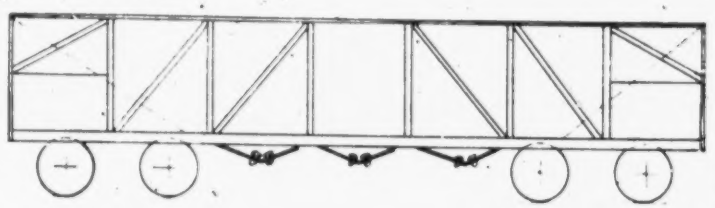


MATERIAL FURNISHED PER CAR

12 -	HOOKS	PK27
6	PAWLS	PK2A
6	"	PK2B
6	BRACKETS	PK21A
6	"	PK21B

FILLER CASTING FURNISHED BY BUILDER
DESIGN TO BE APPROVED BY W.R.A.CO.





PATENTED

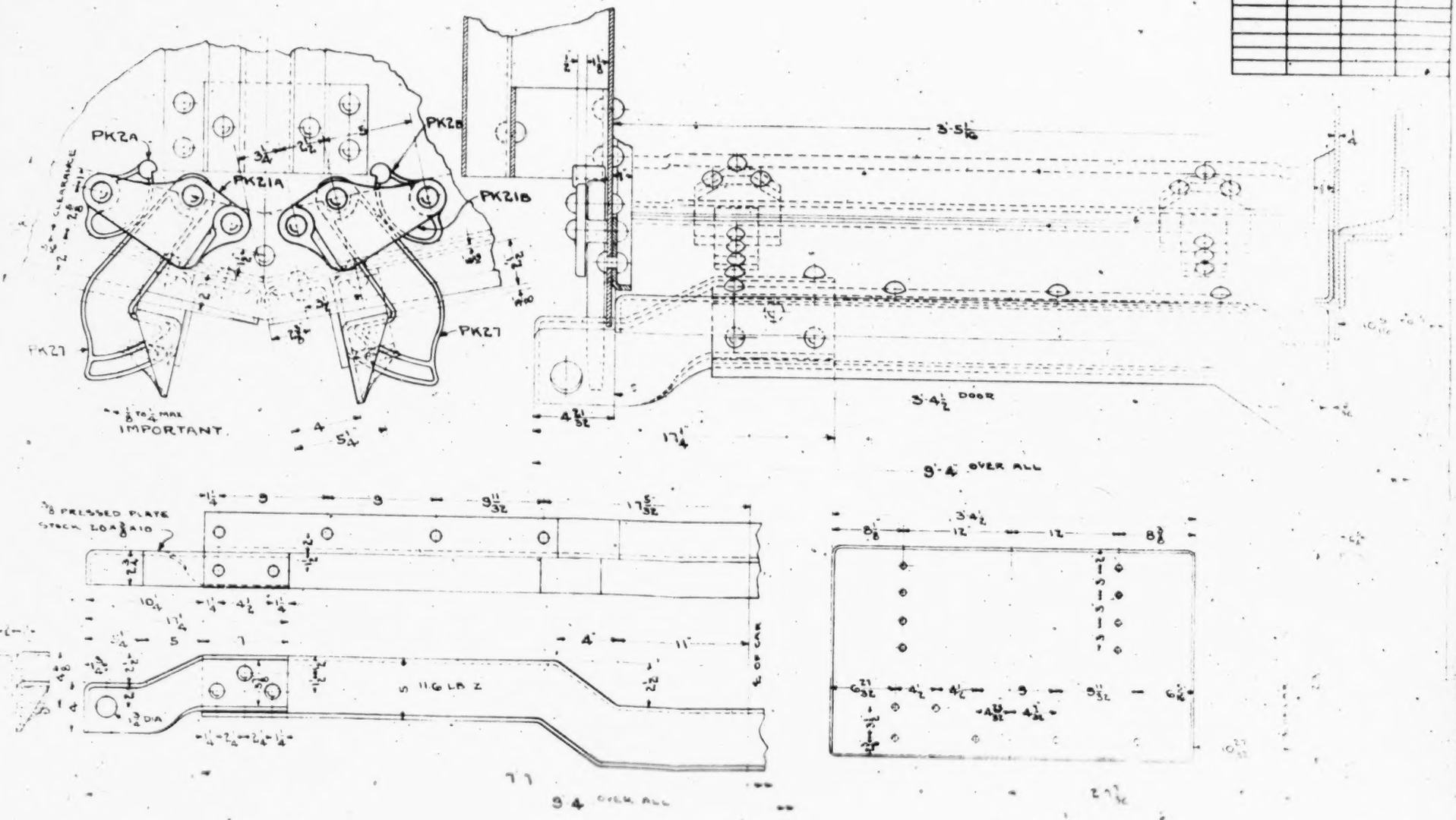
THE WINE RAILWAY APPLIANCE CO.
TOLEDO OHIO
DATE 3-22-22

WINE DOOR LOCKS
COMP. HOPPER CARS

BASED ON B.O. DWGS. PK2B-A PK2A-A PK21A-A PK21B-A PK27-A

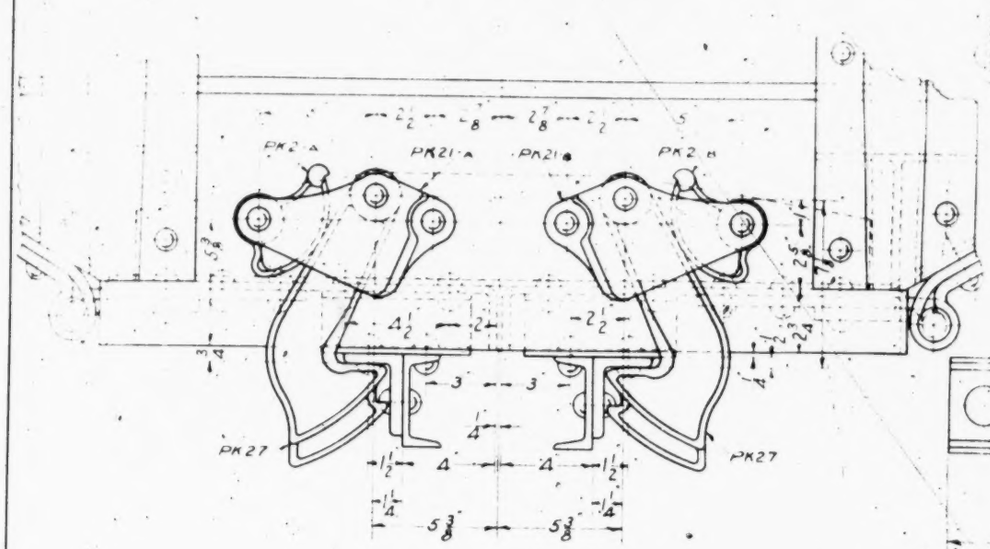
							A	3-B8
							3/4	

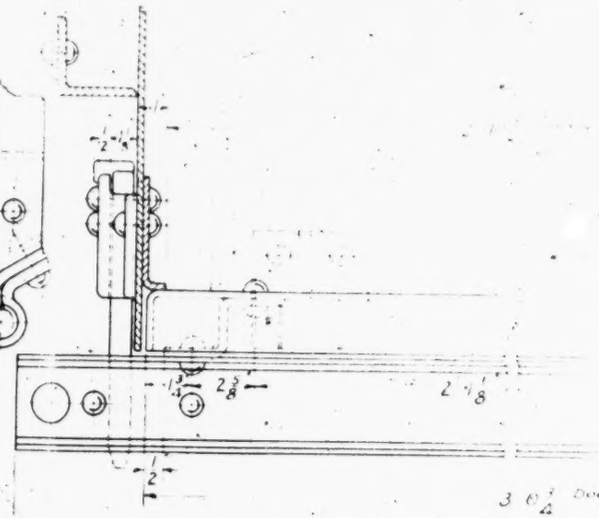
ROAD	CLASS	SERIES	
B&O	W 1	132000	135000

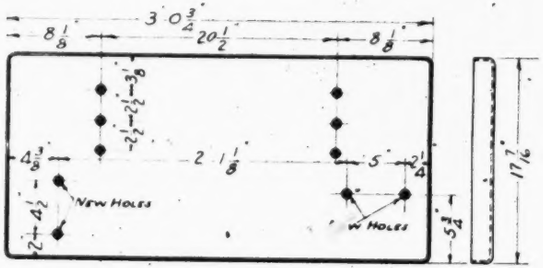


MATERIAL FINISHED PER CAR

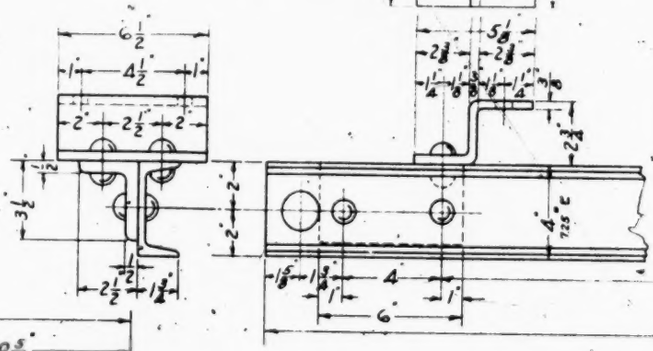
10 BLOCKS	PK 27
8 BRACKETS	PK 21A
8 BRACKETS	PK 21B
8 PANELS	PK 2A
8 PANELS	PK 2B



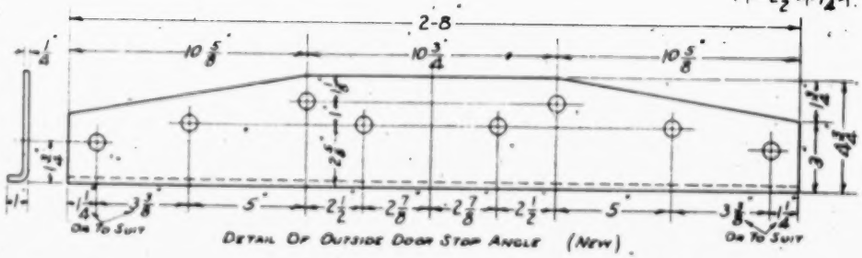




DETAIL OF DOOR SHOWING HOLES

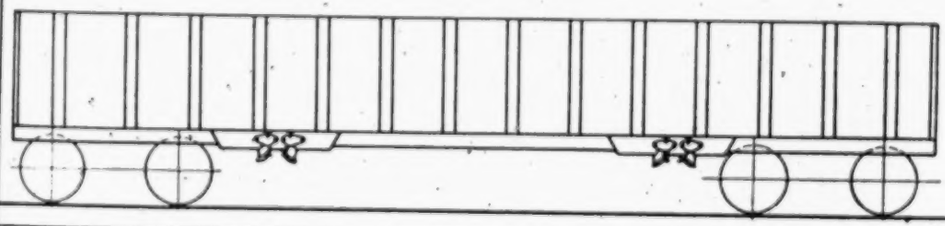


DETAIL OF SPREADER



DETAIL OF OUTSIDE DOOR STOP ANGLE (NEW)

ALL RIVETS ⅞ DIA. UNLESS OTHERWISE



MATERIAL FURNISHED PER CAR

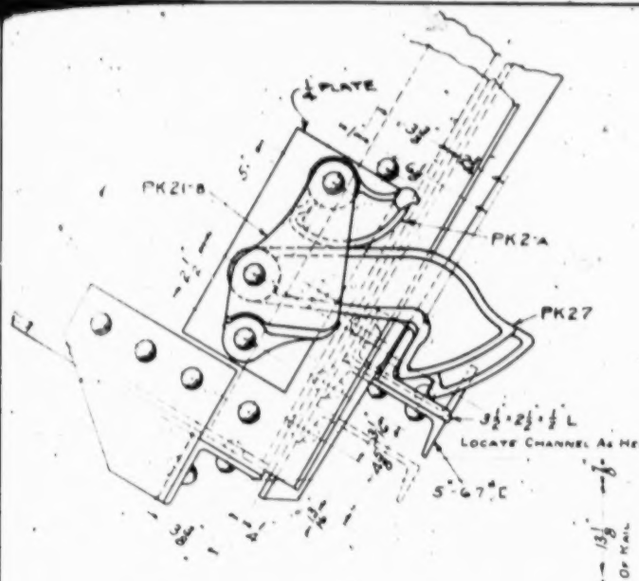
8 HINGES	PK27
4 BRACKETS	PK21A
4 "	PK21B
4 PANELS	PK2 A
4 "	PK2 B

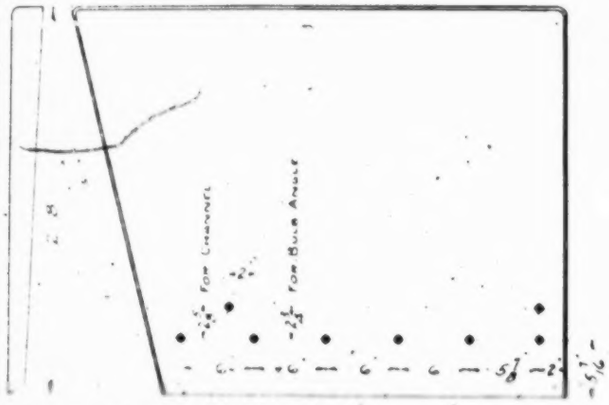
THE WINE RAILWAY APPLIANCE CO.
TOLEDO OHIO
APRIL [illegible]

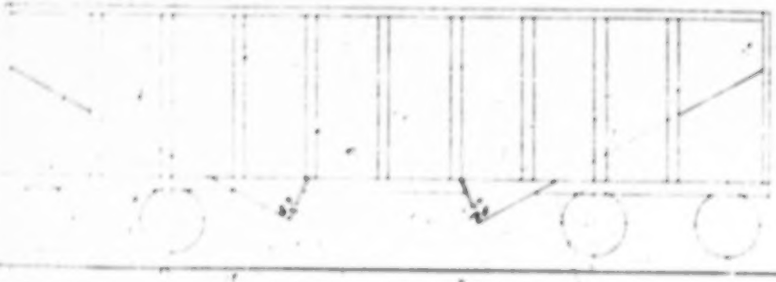
WINE DOOR LOCKS

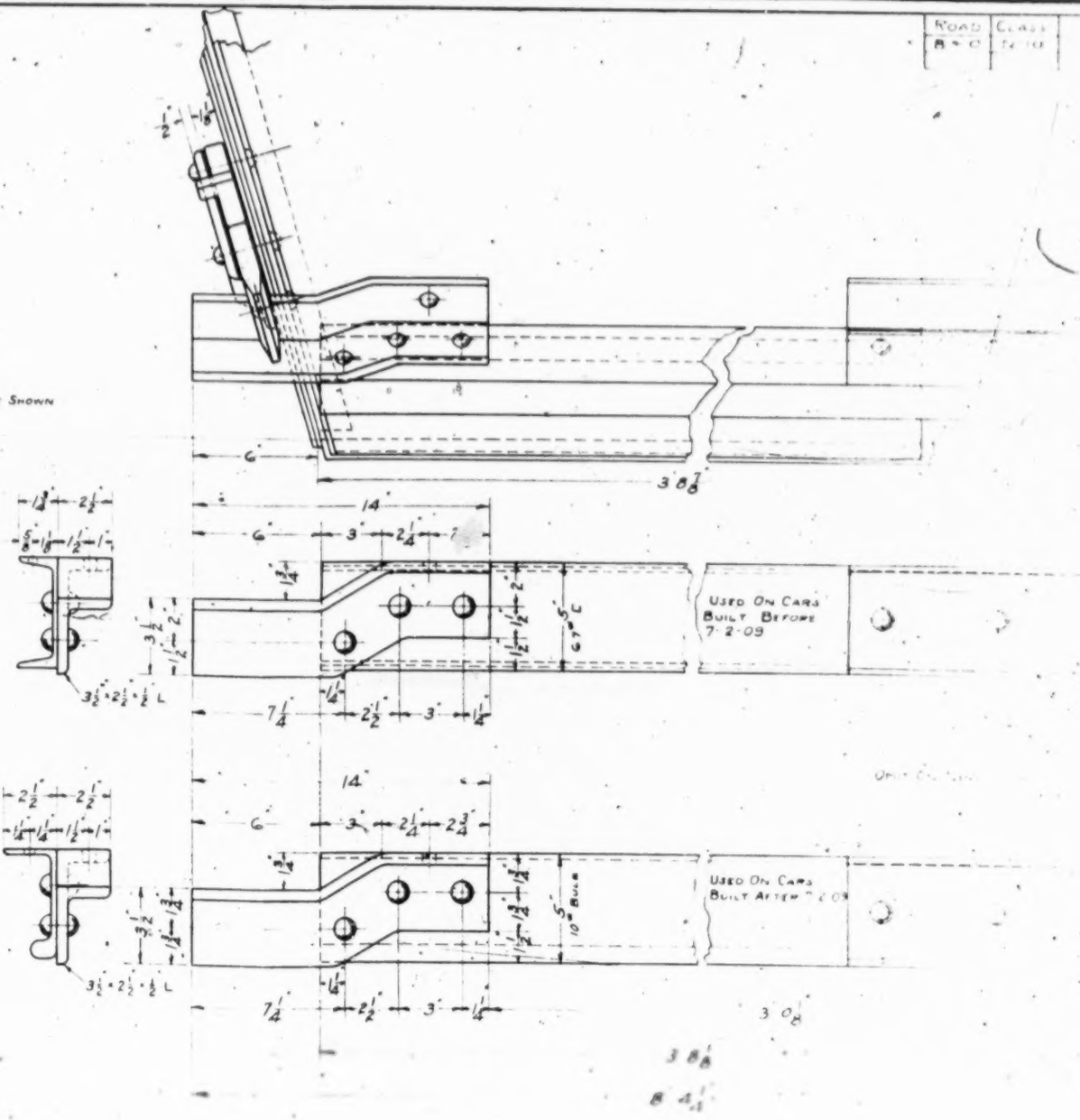
APPLICATION STEEL GONDOLAS
BASED ON B & O DWG 1923 & 1884

								4-14-27	3-B107



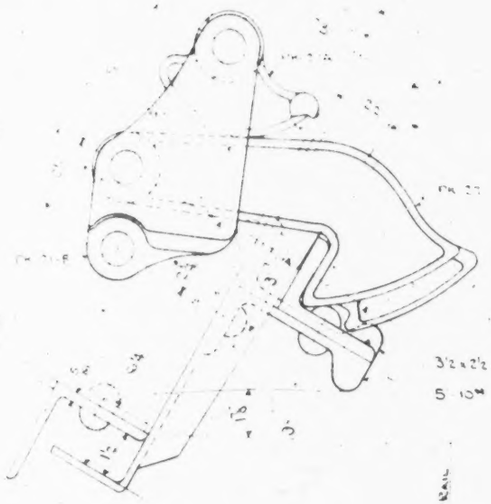




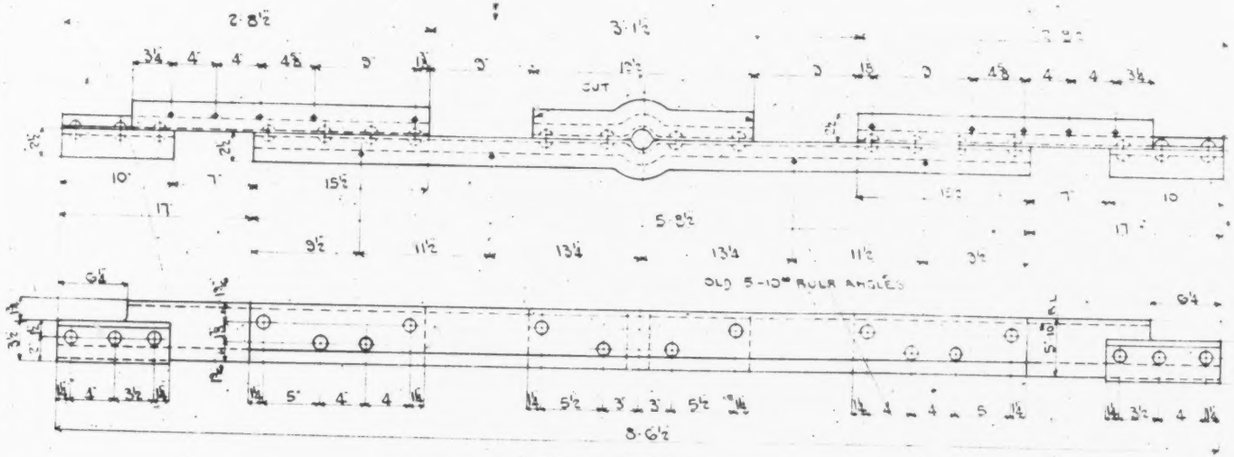


Material Furnished Per Car

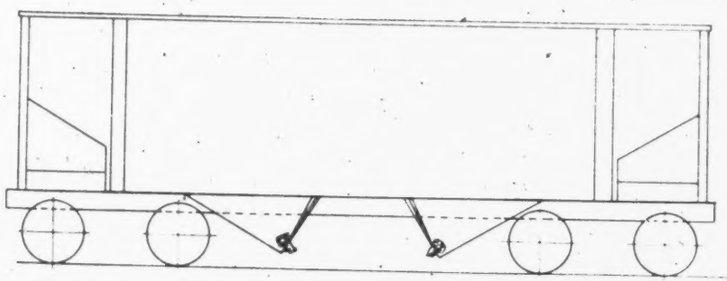
4 Hooks	PK 27
2 Channels	PK 2-A
2 Plates	PK 2-A
2 Brackets	PK 21-A
2 Brackets	PK 21-B



3½x2½x½ L
5 10# BULB ANGLES



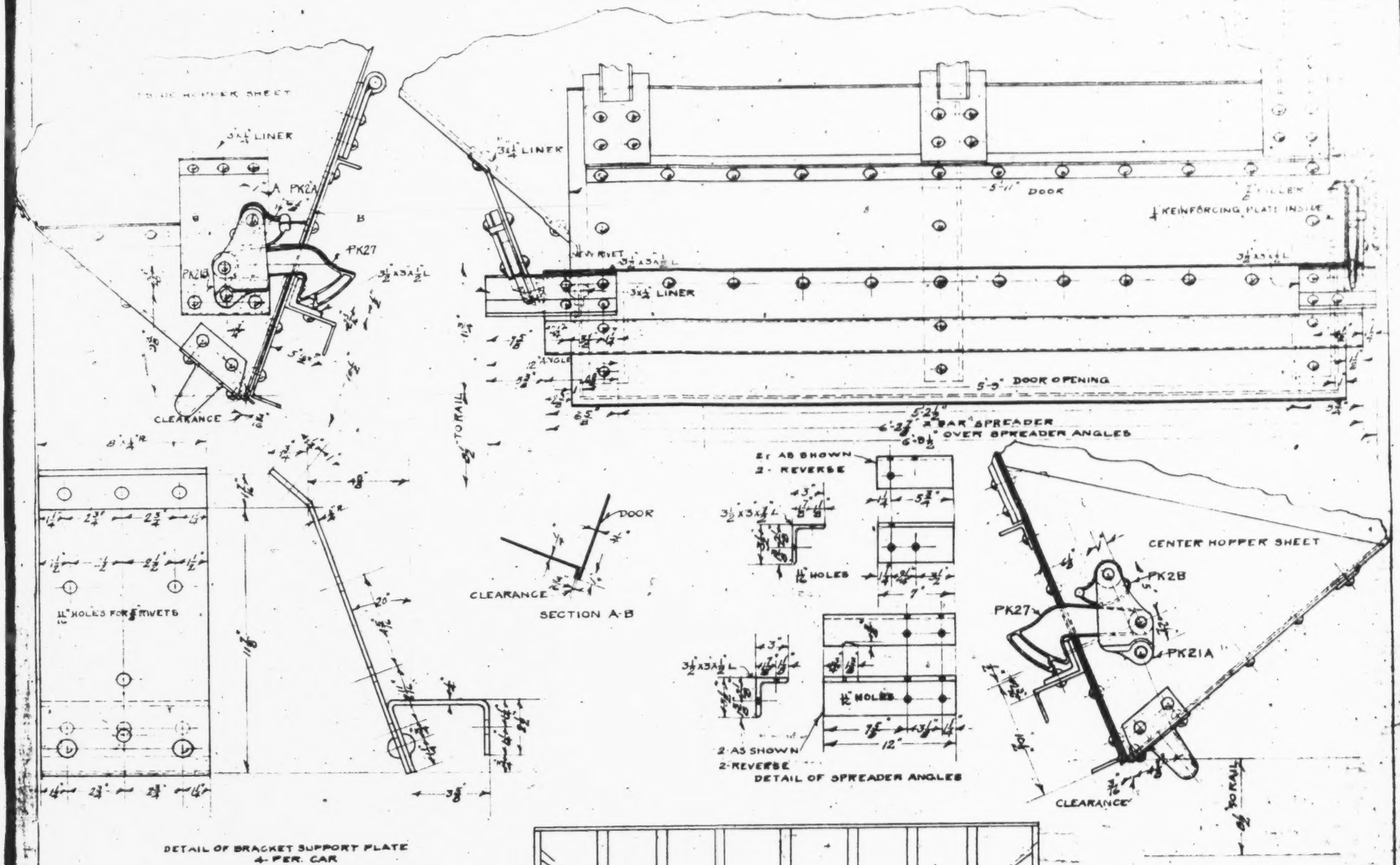
DETAIL OF SPREADER



MATERIAL FURNISED PER CAR

4	HOOKS	PK-27
2	BRACKETS	PK-21A
2	BRACKETS	PK-21B
2	PAWLS	PK-2A
2	PAWLS	PK-2B

THIS DRWG SUPERSEDES - DWG N° W 252



DETAIL OF BRACKET SUPPORT PLATE
4- PER CAR

MATERIAL FURNISHED PER CAR

4	BRACKETS	PK21A
4	"	PK21B
4	PAWLS	PK2A
4	"	PK2B
8	HOOKS	PK27

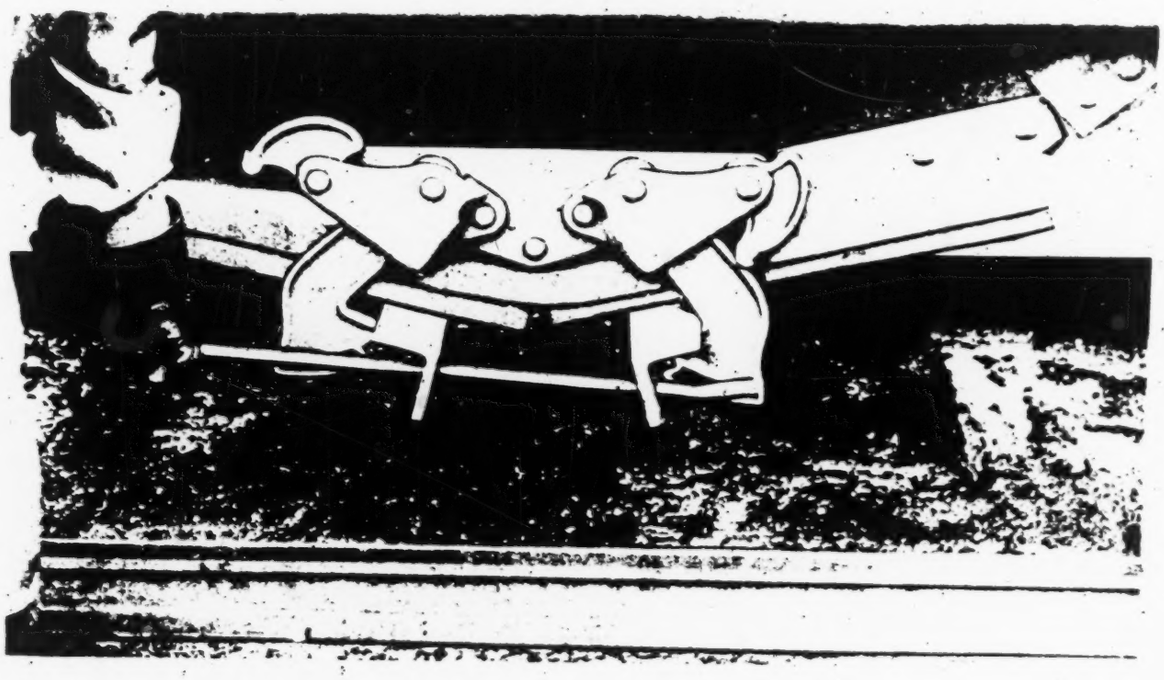
NOTE—
FILLER CASTING FURNISHED BY BUILDER.
DESIGN TO BE APPROVED BY W.R.A.CO.

PATENTED

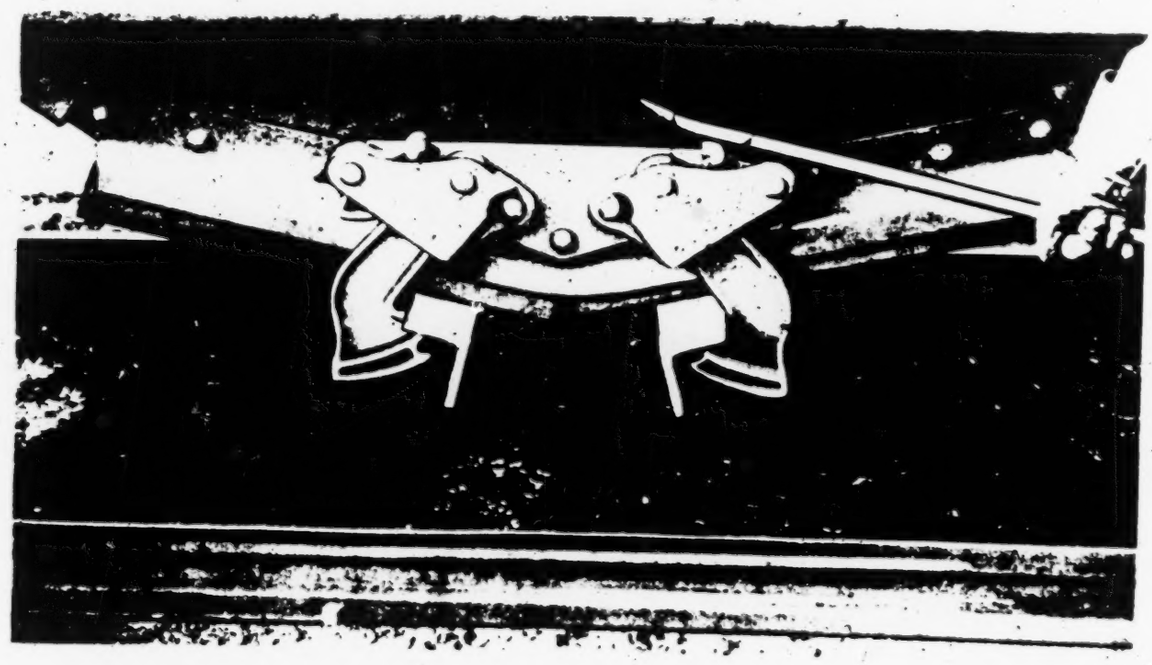
THE WINE RAILWAY APPLIANCE CO.
TOLEDO OHIO.
DATE 11-22-26
WINE DOOR LOCKS
APPLICATION TO [illegible] HOPPER
[illegible]
B A 3-B-23

Enterprise Exhibit 11
D.V.H.
4,10.31

METHOD OF CLOSING DOORS



Prying left hand door to final closed position.

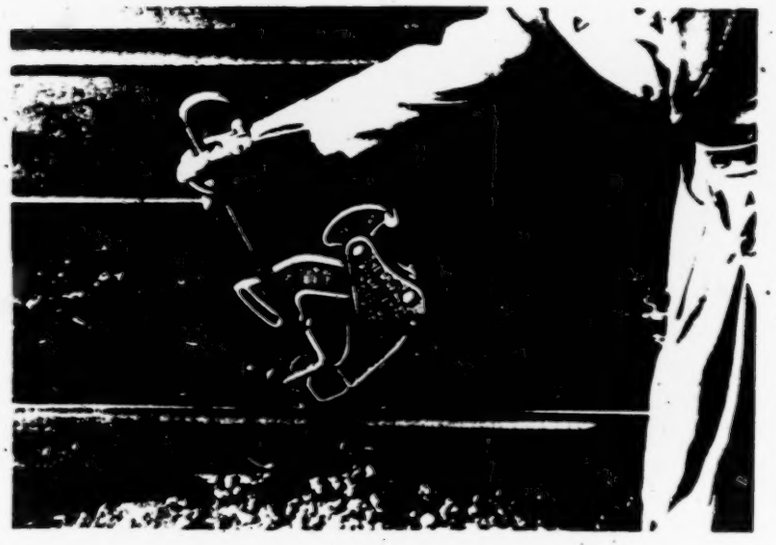


Locking Pawls.

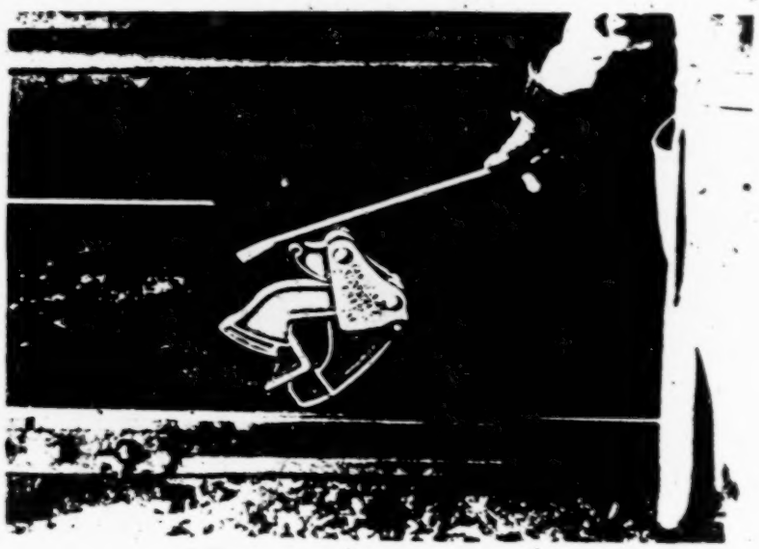
METHOD OF CLOSING DOORS

ANOTHER method of closing Wine Drop Door Locks where the construction of the car makes it impossible to use a fulcrum attached to bracket. This prying method is made by applying a steel plate under the door lock bracket.

FULCRUM POCKET FILLER CASTING ON HOPPER CAR



Prying door to final closed position.



Locking Pawl.

J. A. PILCHER.

CAR DOOR ARRANGEMENT.

APPLICATION FILED FEB. 18, 1922.

1,434,145. Patented Oct. 31, 1922.

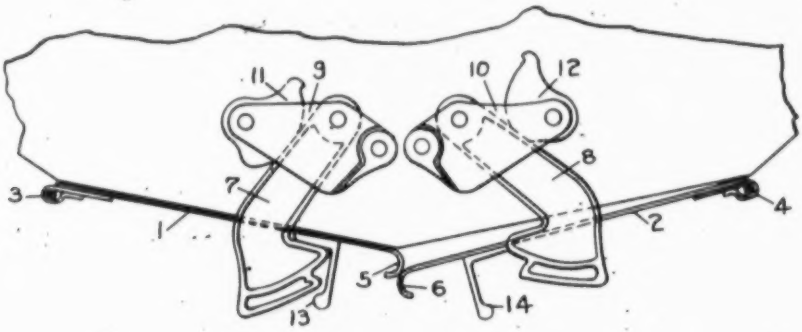


Fig. 1

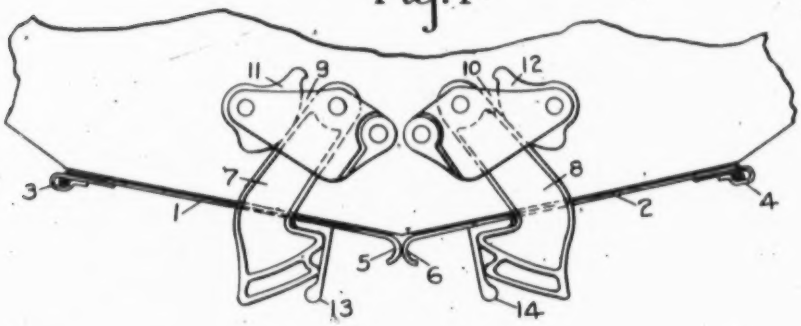


Fig. 2

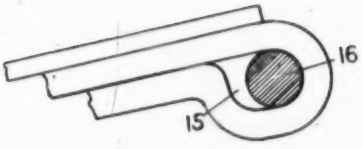


Fig. 3

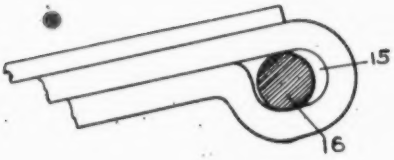


Fig. 4

John A. Pilcher INVENTOR

BY

Blv Kadel. ATTORNEY

Patented Oct. 31, 1922. 1,434,145

UNITED STATES PATENT OFFICE.

JOHN A. PILCHER, OF ROANOKE, VIRGINIA.

CAR-DOOR ARRANGEMENT.

Application filed February 18, 1922. Serial No. 537,461.

To all whom it may concern:

Be it known that I, JOHN A. PILCHER, a citizen of the United States, residing at Roanoke, in the county of Roanoke and State of Virginia, have invented certain new and useful Improvements in Car-Door Arrangements, of which the following is a specification.

This invention relates to a door arrangement for railway cars, and is particularly applicable to the doors of hopper cars where they are arranged in twin fashion. The object of the invention is to provide a door arrangement wherein the door will be effectively sealed in a simple manner so as to prevent loss of lading, particularly when material such as fine coal is to be handled.

With this general and other more specific objects in view, such as the provision of an economical form of door stiffening member and an inexpensive form of hinge arrangement, the invention consists of the formation, combination and arrangement of parts as will be herein described and particularly claimed.

In the accompanying drawings, which illustrate in diagrammatical form a set of doors as applied to a railway car, Figure 1 is a diagrammatical view in side elevation, of a pair of doors applied to a hopper car. The door to the left in this view is shown as fully closed. The door to the right is shown as partially closed. Figure 2 is a view similar to Figure 1, except that in this view both of the doors are shown as fully closed. Figure 3 is a fragmentary view of a door hinge, the relationship of hinge and hinge pintle in this view coinciding with the positions of the doors shown in Figure 1. It will be noted that the scale of this figure is somewhat enlarged over that of Figure 1 or Figure 2. Figure 4 is a view similar to Figure 3, but showing the relative positions of hinge and hinge pintle corresponding to the position of the doors in Figure 2.

Referring now to these drawings, the car illustrated for showing the present embodiment of the invention is of a type in general use today, wherein a pair of doors 1 and 2 are hinged along their remote edges to the car body as at 3 and 4. The free edges 5 and 6 of the doors are arranged to contact each other when the doors are closed. The doors may be supported when closed by any suitable means, but preferably the form of door supporting hooks illustrated in Cremean Patent #1,336,134 is made use of. These hooks are denoted in the present drawings by the numerals 7 and 8. Any suitable form of brackets such as 9 and 10 may be used for securing the hooks to the car side, and the customary locking cams such as 11 and 12 may be supplied to retain the hooks in engagement with the doors. The hooks preferably seat beneath the ends of angle iron stiffeners such as 13 and 14 secured to the under faces of the door plates. The supporting points are preferably near the free edges of the doors, and it is also preferable that the doors 1 and 2 shall lie upon inclined planes so that the free edges of the doors when closed are lower than the hinged edges thereof. This is desirable so that the effect of gravity may at all times be utilized to hold the door edges in contact with each other when the car is under load and equipped with the present improvements.

It will be noted that the hinge apertures such as 15, shown more clearly in Figures 3 and 4, are elongated in a direction coincident with the width of the doors, or in other words, these apertures are made of such length as to allow a slight slippage of the doors with respect to the hinge pintles 16 thereof, or with respect to the car body, either toward the hinged edge of the door, or away from the hinged edge of door into contact with the abutting edge of the adjacent door.

It will be noted that when the doors are entirely released from the hooks 7 and 8, both doors 1 and 2 will, upon swinging downward, drop to the extremely downward position allowed by the length of the hinge apertures 15. Upon now raising the free edge of door 1, it will remain in this same extreme hinge position, and even when the locking face of the hook 7 is properly seated beneath the one leg of the angle 13, the door 1 will be at the extreme outward position allowed by the clearance of the hinge pintle in this aperture, the door 1 being shown in this position in Figure 1. It will be noted that upon the application of a suitable force to the free edge of the door 1, as at 5, this door may slip toward the hinged edge of

the same, due to the hinge clearance aforesaid.

When door 2 is now lifted up, it will also be in this extreme hinge position, and the edge 6 thereof will, because of this abnormal displacement contact or slightly overlap the corresponding free edge 5 of the door 1. This contacting of the edge 6 of door 2 with the edge 5 of door 1 is clearly shown in Figure 1. As the free edge of door 2 is now more forcibly lifted, the contacting of the edges 5 and 6 will induce sufficient and suitable forces to cause at least one of the doors, and possibly both of them, to slip toward their respective hinged edges, so that the doors when fully closed will occupy the tightly abutting positions shown in Figure 2.

The form of door supporting device heretofore noted as especially desirable for use with this type of door allows this slipping movement without any interference from the door supporting mechanism itself.

When the doors are in this closed position, it will be appreciated that the weight of the lading upon the door will constantly tend to hold the doors tightly against each other at 5 and 6, due to the fact that the free edges of the doors are at a lower level than the hinged edges thereof. It will be noted furthermore that the provision for the hooks 7 and 8 to swing toward each other and toward the free edges of the doors into locking position will permit the two doors to keep constantly working toward each other as the car vibrates in transit, without any hindrance from the hook mechanism.

The free edges of the doors are turned downward or formed into roll shape, for the purpose of causing this slippage of the doors heretofore described. The curved abutting edge of each door thus forms in effect an inclined plane against which the opposite door may react to produce the effects desired. The rolled edges also constitute integral stiffeners for the edges of the doors to prevent buckling of the same.

The door arrangement described provides in a very simple manner an effective means whereby the doors are always held in tight abutment, and when used with a positive securing mechanism such as the hooks shown and identified, provides a door arrangement that offers a maximum of security against loss of lading. The arrangement is entirely inexpensive, as in practice the doors may be constructed in the present manner with practically no additional cost whatsoever.

I have thus described a preferred embodiment of the invention. Other embodiments are contemplated within the scope of the appended claims without departing from the spirit of the same.

What is claimed is:

1. In a door arrangement for railway cars, a door hinged to the car body, along one of its edges, an abutment arranged for contact with the free edge of the door when the same is in closed position, the door being arranged to slightly over-reach the said abutment when nearly closed and being capable of a slight slippage toward its hinge point upon the application of a sliding force to the free edge of the door, the said abutment and the adjacent edge of the door being so associated that force applied to lift the free edge of the door into fully closed position will produce a resultant slippage force of the character set forth.

2. In a door arrangement for railway cars, a door hinged to the car body, the hinges therefor being arranged to allow a slippage of the door to or from the hinge point thereof, door-supporting means, and an abutment arranged for contact with the free edge of the door, the aforesaid slippage being of sufficient amount and the parts being so arranged as to permit and cause the free edge of the door to overlap the face of the abutment when the door is nearly closed and the entire door to move toward the hinge point of the door as the closing operation is completed.

3. In a door arrangement for railway cars, a pair of doors hinged to the car body with their free edges adjacent and arranged to abut when the doors are closed, means for supporting the free edges of the doors, the said doors being arranged to over-reach each other at their free edges when nearly closed, the door hinges being arranged to allow a slippage of at least one of the doors toward the hinge point thereof upon application of a sliding face to the free edge of the door.

4. In a door arrangement for railway cars, a pair of doors hinged along their remote edges to the car body and with their free edges abutting each other, the hinges for said doors having elongated pintle openings so associated as to permit relative movement of the doors toward or away from each other in response to suitably directed forces applied thereto, the free edges of the doors being arranged to contact each other when the doors are nearly closed, and being so formed and shaped that movement of either door toward fully closed position will cause at least one of the doors to move toward its hinge points.

In testimony whereof I affix my signature.

JOHN A. PILCHER.

ENTERPRISE EXHIBIT 4

Kadel & Pilcher Patent No. 1,268,785

Issued to B. W. Kadel & J. A. Pilcher June 4, 1918

B. W. KADEL & J. A. PILCHER.

RAILWAY CAR.

APPLICATION FILED MAY 9, 1917.

1,268,725.

Patented June 4, 1918.

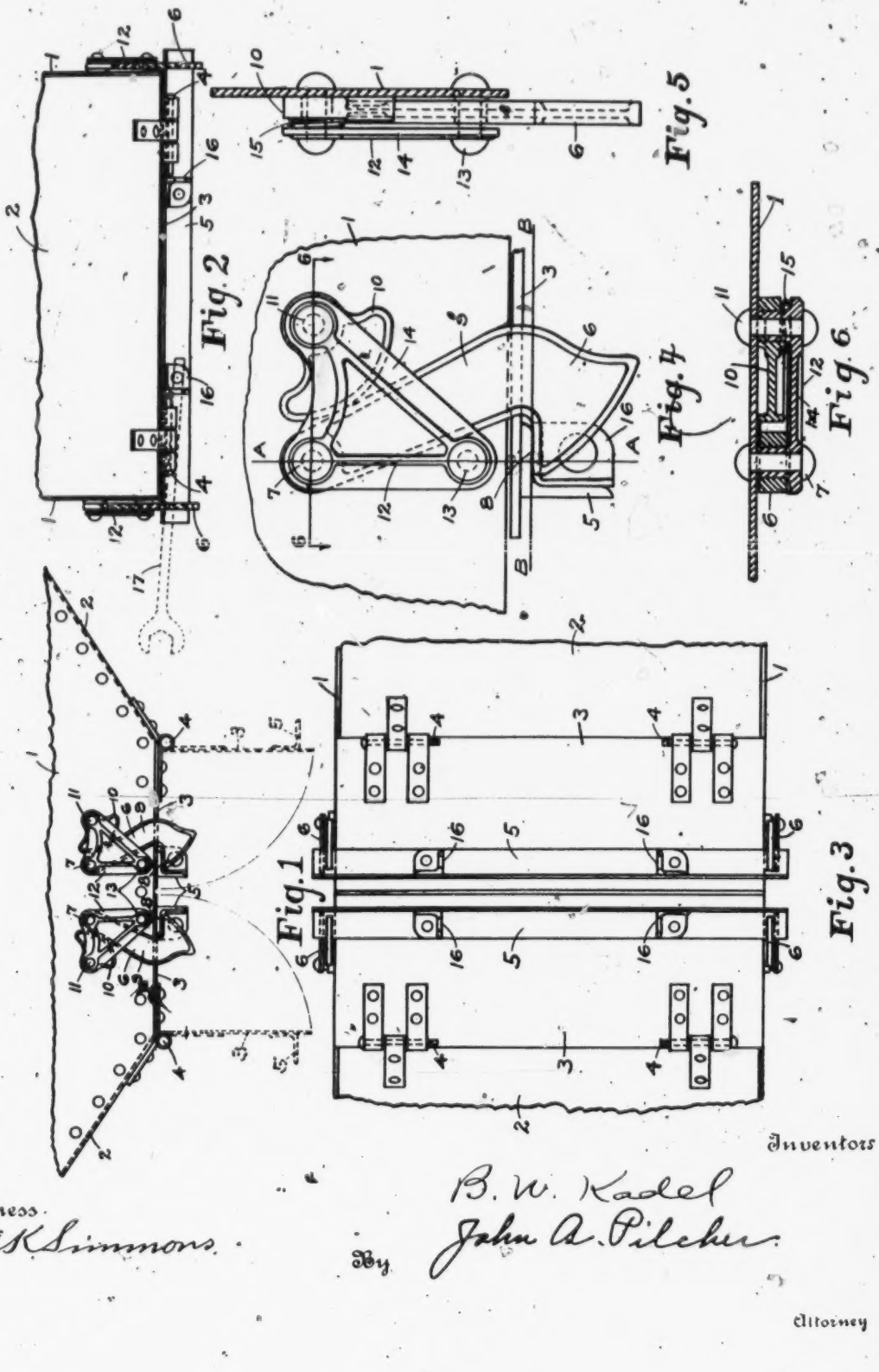


Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Witness
A. K. Simmons.

Inventors
B. W. Kadel
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By

Attorney

UNITED STATES PATENT OFFICE.

BYERS W. KADEL, OF ROANOKE COUNTY, AND JOHN A. PILCHER, OF ROANOKE, VIRGINIA.

RAILWAY-CAR.

1,268,725. Specification of Letters Patent. Patented June 4, 1918.

Application filed May 9, 1917. Serial No. 167,598.

To all whom it may concern:

Be it known that we, BYERS W. KADEL and JOHN A. PILCHER, citizens of the United States, residing, respectively, in the county of Roanoke and in the city of Roanoke, State of Virginia, have invented certain new and useful Improvements in Railway-Cars, of which the following is a specification.

This invention has to do with railway cars of the drop bottom or hopper bottom type, and its particular object is to provide an improved arrangement of door parts and improvements in door securing mechanisms. With these general objects and other incidental ones in view the invention consists of the formation, combination and arrangement of parts as will be herein described and claimed.

In the accompanying drawings, Figure 1 is a side elevational view of a portion of a car having an embodiment of our invention applied thereto. Fig. 2 is a broken end elevational view of the same. Fig. 3 is an inverted plan view showing the bottom of the doors of Figs. 1 and 2. Fig. 4 is an enlarged side elevational view of the door securing mechanism, and Fig. 5, a similar end elevational view of the same, a portion of the car body being shown in cross section in this figure. Fig. 6 is a horizontal sectional view taken through the pivots of the hook and cam and substantially on the line 6—6 of Fig. 4.

Referring now to these drawings, the car body is represented as having sides 1 and a bottom 2. In the bottom of the car is a door opening and to close the same a pair of transversely-disposed, hinged doors 3 are provided. These doors are located with their free edges adjacent each other and with pintles 4 disposed transversely of the car and along their remote edges and are adapted to swing toward each other into closed position. Each door embodies a door plate which has secured along its free edge and on its lower face a stiffening member such as the angle iron 5 and this member projects beyond the ends of the door plate and beyond the lines of the car sides so as to form convenient projections to be engaged by the door hooks 6 when the door is in closed position. These hooks are pivoted at 7 to each of the car sides and swing parallel with the side of the car to reduce the road clearance necessary. The hooks for a pair of doors are turned to swing toward the free edges of the doors, in opposite directions, and toward each other to engage the doors, and the hooks are pivoted with respect to their centers of gravity so that they will fall by gravity into engaging positions.

The angle irons 5 are attached to the door plates with their flat legs beneath the plates and with their outstanding legs nearest the free edges of the doors and the hooks swing into engaging position toward each other beneath the flat legs of the angles and toward the outstanding legs thereof.

The locking face 8 of the hook is shaped to conform to the flat leg or locking face of the projecting angle iron, and this locking face is so disposed with respect to the pivot point 7 of the hook that a line (A—A in Fig. 4) drawn through the axis of the pivot 7 and normal to the plane (B—B in Fig. 4) of the locking faces, will intersect the locking faces. With these faces so disposed the tendency is for the door to remain closed. And the stem 9 of the hook extends in a path at an acute angle with the plane B—B of the locking faces to clear the angle 5 and to assure the hook always dropping into engaging position. The center of pressure between the door and the hook is so disposed that, together with the formation of the parts as already described, the force will always tend to swing the hooks into engaged position rather than to release the doors.

A gravity eccentric cam 10 is supplied for each hook, these being pivoted to the car side at 11. A housing or bracket 12 is also supplied to embrace these two pivot points and to cover and tie together and brace the hook and cam. This bracket 12 has three holes disposed in triangular arrangement, the two upper ones being coincident with the pivot points 7 and 11 and the third one, designated 13 being attached directly to the car body for stiffness. This bracket embodies a plate portion 14 which overlies the hook and cam and prevents them from swinging out of line. It also has hubs at the points 7, 11 and 13 which bear against the side of the car and are of slightly greater length than the thickness of the cam or the hook. Securing rivets pass through suitable openings in these hubs and through coalining holes in the car sides. The pivot holes in the hook and the cam are of such

size as to fit loosely over these hubs so that the two upper hubs of the bracket 12 form the pintles for the hook and cam. The lower hub, at 13 forms a stop for the hook so that it cannot swing into a position to foul the door angle when the door is swung up.

In order that the cam 10 may not drop out of position when the car is turned upside down in a modern car dumper, a coil spring 15 is inserted between the plate of the bracket 12 and the cam, holding the cam endwise against the car and causing enough friction to retain it against falling out of its own weight.

Any convenient arrangement may be used for raising the doors into closed position but we preferably omit the customary winding arrangement and lift the doors by hand. In order that a door may be readily grasped by a man standing at the side of the car there is supplied to the under face of the door means such as the bracket 16 for the retention of the end of a removable bar such as the wrench 17 shown in the drawings. By allowing such bar to bear against any convenient part of the door edge, the end projecting well out beyond the face of the car forms a lever and the door may be readily raised into latched position. Such a bar or a wrench or the like is always available.

Thus we have produced a car door device that offers an exceptionally free outlet for the contents of the car; that is light in weight and economical in construction; that can never stand partly open to allow loss of lading; that cannot accidentally become open while *en route;* that is easily and quickly manipulated and without special wrenches or tools and the mechanism also takes up less space and allows a consequent increase in the size and capacity of the car.

And having thus described an embodiment of our invention, what we now claim is:

1. A railway car having a pair of adjacent hinged doors disposed with their pintles along their remote edges and adapted to swing toward each other into closed position, projections on the doors and hooks pivoted on the car and adapted to engage the said projections, the hooks being turned in opposite directions and each hook being pivoted in such manner as to swing by gravity into engaged position, said hooks being disposed so as to swing toward the pintles of their respective doors for disengagement with the projections.

2. A railway car having sides and a hinged door, said door extending transversely of the car from one side to the other, hooks pivoted to the sides of the car and adapted to engage the said door when the latter is drawn into closed position, said hooks being so formed and disposed as to fall by gravity into engaging position and to be swung toward the door pintles for disengagement with the said door.

3. A railway car having a hinged door said door embodying a door plate with reinforcing angle iron secured along its free edge, the angle iron extending beyond the ends of the door plate, hooks pivoted to the car and adapted to engage the projecting ends of the said angle iron when the door is in closed position, the said hooks being formed and disposed to seat beneath the flat leg of the angle iron and in a direction toward the outstanding leg thereof.

4. A railway car having a hinged door a flat locking face on said door, a hook pivoted to the said car and having a locking face formed to engage and conform to the locking face on the said door, the pivot point of the said hook being so disposed that a plane through the axis thereof and erected normal to the plane of the locking faces will intersect the said locking faces, the stem of the said hook extending in a path at an acute angle with the plane of the locking faces.

5. A railway car having a movable door, a hook pivoted to the car and adapted to engage said door and to hold the same in closed position, a cam also pivoted to the car and adapted to hold the said hook in engaged relationship with the door, and a bracket having three holes therein, the same being affixed to the said car and embracing the said hook and the cam, two of the holes thereof being coincident with the pivot points of the said hook and cam, the said bracket being affixed to the car at all of the said holes thereof.

6. A railway car having a movable door, a hook pivoted to the car and adapted to engage said door and to hold the same in closed position, a cam also pivoted to the car and adapted to hold the said hook in engaged relationship with the door, a plate overlying the said hook and the cam and affixed to the car at the pivot points thereof and at another point removed from the said pivot points, the said plate being formed and disposed to guide and restrain the said hook.

7. A railway car having a movable door, a hook pivoted to the car and adapted to engage said door and to hold the same in closed position, a cam also pivoted to the car and adapted to hold the said hook in engaged relationship with the door, a triangularly-shaped plate overlying the said hook and the cam and affixed to the car at points in each of the three corners thereof, the affixing means at two of said points forming pintles for the said hook and cam and the securing means at the third point forming a stop for said hook, the said plate being so formed and disposed as to guide and restrain the said hook.

8. A railway car having a body and

movable door, a hook pivoted to the car body and adapted to engage said door and to hold the same in closed position, a cam also pivoted to the car body and adapted to hold said hook in engaged relationship with the door, a plate overlying the said hook and the cam and attached to the car body at the said pivot points thereof, the said plate having pierced bosses on its inner face of greater length than the thickness of the hook and cam and the hook and cam being provided with openings to rotatably embrace the said bosses, there being securing means passing through the said holes in the plate and attaching the same to the car body, the inner ends of the bosses abutting the car body and the said hook and cam being disposed between the plate and the car body.

9. A railway car having a body and a movable door, a hook pivoted to the car body and adapted to engage said door and to hold the same in closed position, a cam also pivoted to the car body and adapted to hold said hook in engaged relationship with the door, and a spring adapted to hold the said cam against said hook.

10. A railway car having a body and a movable door, a hook pivoted to the car body and adapted to engage said door and to hold the same in closed position, a cam also pivoted to the car body and adapted to hold said hook in engaged relationship with the door, the said cam being so formed and disposed as to tend to seat against the hook by virtue of its own weight, and a spring acting against said cam in a direction parallel with the axis of the pivot thereof, and adapted to force the said cam into frictional engagement with a portion of the car.

11. A railway car having sides and a hinged door extending transversely of the car from one side to the other, hooks pivoted to the car and adapted to engage the said door when the latter is drawn into closed position, and means for closing the door, said means embodying a lever extending outside of the line of one of the car sides and removably attached to the door, and means on the door for the removable attachment thereto of the lever.

In testimony whereof we affix our signatures.

BYERS W. KADEL.
JOHN A. PILCHER.

B. W. KADEL.

CAR DOOR DEVICE.

APPLICATION FILED JUNE 28, 1922.

1,434,123. Patented Oct. 31, 1922.

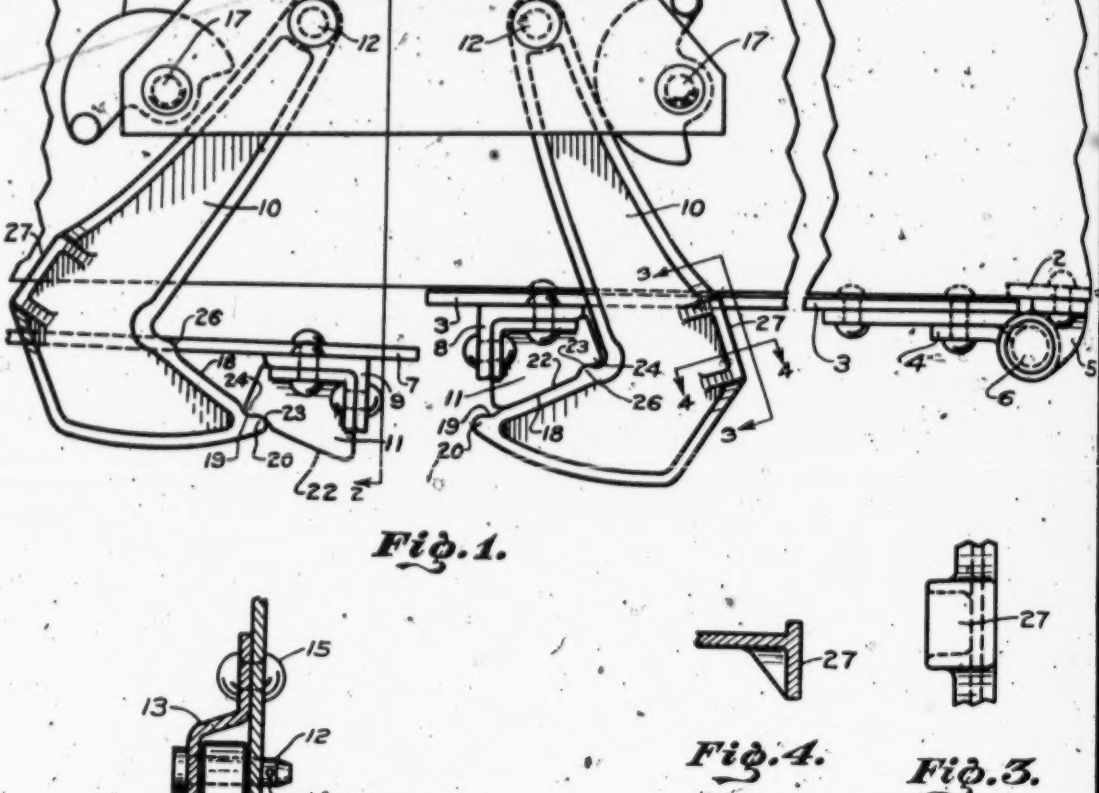


Fig. 1.

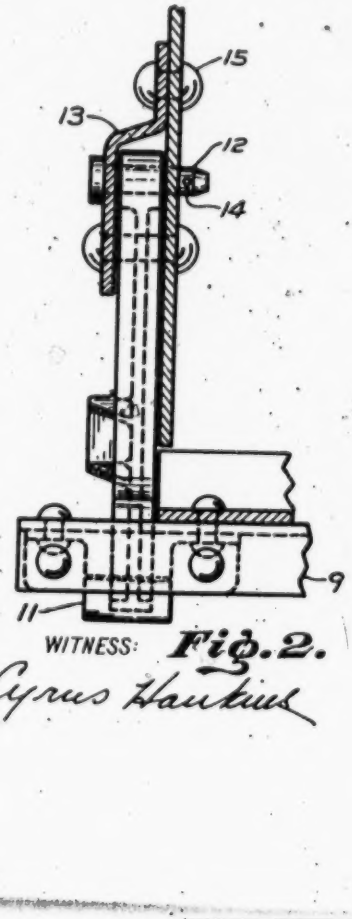


Fig. 2.

Fig. 4.

Fig. 3.

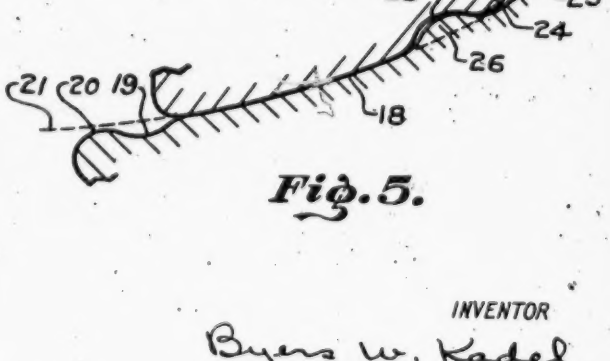


Fig. 5.

WITNESS:

Cyrus Hawkins

INVENTOR

Byers W. Kadel

UNITED STATES PATENT OFFICE.

BYERS W. KADEL, OF BALTIMORE, MARYLAND.

CAR-DOOR DEVICE.

Application filed June 28, 1922. Serial No. 571,413.

To all whom it may concern:

Be it known that I, BYERS W. KADEL, a citizen of the United States, residing at Baltimore, in the county of Baltimore and State of Maryland, have invented certain new and useful Improvements in Car-Door Devices, of which the following is a specification.

This invention relates to a door device for railway cars and has among its objects to provide a simple form of door closing and supporting mechanism. Another object is to provide a door supporting device wherein the door may be lifted by hand to a temporary position, and be retained in this temporary position by means of a portion of the device, from which temporary position the door may be forcibly closed by moving the supporting mechanism to its final position, the movement of the supporting mechanism causing the closing movement of the door. Another object is to provide, with a door, a swinging door hook which, when supporting the door at the final closed position, will be retained in that position by interlocking of the supporting surfaces. Another object is to provide, with a door, a closing and securing device which may be effectively operated without the aid of special tools or attachments other than any available implement with which a blow may be struck, and further to provide on the supporting device a definite and satisfactory place on which the blows from the external implement may be applied to force the supporting member into final engagement with the door.

Another object is to provide, with a door, a member attached to the door and arranged for co-operation with a swinging door supporting hook in such manner that the engaging surfaces of the door member and the supporting ledge of the hook will, when the hook is forced to its final position, cause the door to be forcibly closed and secured in the said closed position, but so arranged that the interlocking surfaces securing the hook in the final position will not be subject to wear from the closing action or from forcing the hook to its final position.

With these and other objects in view, the invention consists of the formation, combination and arrangement of parts as will be hereinafter described and particularly claimed. In the accompanying drawings, which show a preferred form of the invention, Figure 1 is a fragmentary side elevational view, showing a portion of a car body equipped with doors and a supporting mechanism therefor embodying the principles of the present invention. In this figure the door at the right side is shown as fully closed and the one at the left is shown as supported in a temporary and partly closed position.

Figure 2 is a transverse vertical section of the same, this view being taken approximately on the line 2—2 of Figure 1.

Figure 3 is a view of a portion of the back of one of the door-supporting hooks, this view being taken substantially on the line 3—3 of Figure 1. Figure 4 is a fragmentary sectional view through one of the hooks, the section being taken on the line 4—4 of Figure 1. Figure 5 is a diagrammatical view outlining the co-operating contours of the supporting ledge of a door-supporting hook and of the hook seat on the door.

Referring to these drawings, the side of the car is indicated by the numeral 1, and a fragment of the floor of the car is shown at 2. A door 3 is hinged in the floor of the car by means of co-operating body and door hinges 4 and 5, a hinge pintle being indicated at 6. The door in the present embodiment is shown as arranged transversely of the car. There is also shown a fragment of a similar door 7, which, with the door 3, may constitute a pair of symmetrical doors. Extending along the free edges of these doors are stiffening members of angular section indicated by 8 and 9. The ends of these stiffening members extend outward beyond the edges of the doors where they constitute arms for co-operation with swinging door-supporting members, such as the hooks 10. These angular members may be supplied with filler pieces or hook seats, such as 11, an embodiment of which will shortly be described. One of the hooks 10 is provided for each side of the door, and these are pivoted to the side of the car body by means of pintles 12. A bracket 13 overlies the outer faces of the hooks, and the pintles 12 extend through this bracket and through the side 1 of the car. Cotter pins such as 14 may be used to secure the pintles 12 against loss. Additional securing means such as the rivets 15 may be provided for the bracket 13. Cams 16 of the customary

type may be provided to hold the hooks in engagement with the door arms 8 and 9, these being shown as pivoted between the car side and the bracket 13 by means of the rivets 17. In addition, certain securing features are embodied in the hooks 10 and filler pieces 11 by arranging for interlocking of the interengaging surfaces of these parts. This will be hereinafter described.

Preferably each of the door supporting hooks 10 is provided with a supporting ledge 18, the contour of which is eccentrically inclined so that successive positions along the supporting ledge, beginning at the point of the ledge and progressing towards the root thereof, are successively at decreasing distances from the pivot point of the hook. This causes a lifting motion to be imparted to the door when the hook is forced into engagement therewith.

The point of the supporting ledge of the hook is preferably provided with a transverse corrugation, such as 19, thereby forming in effect a knob 20 at the extreme point of the supporting surface of the hook. Preferably the upper limit of the knob 20 is on line with, or at least not above, the general normal contour of the supporting ledges, an extension of this contour being indicated for reference purposes by the dotted line 21.

The general contour of the hook-engaging face 22 of the filler piece 11 is arranged to conform to the contour of the supporting ledge when the hook is in full and final engagement with the door. The advance edge of the hook seat 11 is also preferably provided with a transverse corrugation 23, thereby providing in effect a knob 24 at the advance point of this member. The lowermost limit of this knob 24 preferably coincides with or at least does not fall below the general contour line of the seat of the member 11, an extension of this contour being indicated for reference purposes by the dotted line 25 in the drawings.

These corrugations and knobs form a positive preliminary supporting arrangement whereby the door may be supported upon the point of the hook in a preliminary position, not fully closed. It will be noted that in this preliminary position, the knob 24 will fall within the corrugation 19 and the knob 20 will fall within the corrugation 23. The contours of these corrugations and knobs should be so arranged that the member 11 will not slip off the point of the hook when in such preliminary engagement.

After being supported in this preliminary manner, the hook may be driven into more complete engagement with the door member 11, this movement of the hook effecting, as heretofore described, the more complete closing of the door desired.

Near the function of the supporting ledge of the hook with the shank portion of the hook there may be formed a knob 26, which should extend above the general contour of the ledge, the extension of this contour being indicated, as before stated, by the dotted line 25.

As the hook is driven beneath the door member 11, the knob 26 will, when the hook is in almost complete engagement with the door, contact the knob 24. Further driving of the hook will produce an exaggerated lifting motion of the door by causing the knob 26 to ride over the knob 24. When the hook has been driven into complete and final position the knob 26 will fall within the corrugation 23 and the knob 24 will be in position beyond the knob 26, thereby positively interlocking the two parts in such manner that it will be necessary to drive the hook from beneath the door. Accordingly, by no chance will the hook become disengaged from the door by accident.

The contours of the knobs and corrugations just described may be so arranged that when the hook is in final position beneath the member 11, the support will be upon the main portion of the contour of the ledge of the hook and not upon any of the knobs or corrugations, it being the principal function of these knobs to serve as preliminary supporting means and as final interlocking means rather than as final supporting surfaces, although in some embodiments it may be desired to utilize these members for final supporting as well as for the other purposes described.

The back of each hook is preferably provided with a suitable surface 27 against which blows may be directed to force the hook beneath the door arm. The surface 27 is so designed and located that impacts from these blows will produce the desired results in a suitable manner without injury to the hook or interference with the functioning of the device. The bracket constituting this striking face 27 is also arranged to extend outwardly from the main portion of the hook so that it may be struck by a suitable instrument for driving the hook out of engagement with the door. The effort necessary to release the hook will not be as great as that required for closing the door, gravity tending to assist the opening operation.

It will be seen that I have provided, in a simple and inexpensive manner, a door mechanism for closing and securing car doors, which can be easily operated, and which gives a great range of usefulness without danger to the operator. These advantages are accomplished at no sacrifice in weight and cost of the car.

Having thus described my invention, what I claim is:

1. In a door mechanism for railway cars

combination with a swinging door, of a ook pivoted upon the car body and adapted supportingly engage the door, the said ook being provided with a supporting sur- ce, the contour of which is eccentrically in- ned in such manner that the door will be rcibly closed by the action of the hook en the said hook is moved from a prelimi- ry to a final engaging position.

2. In a door mechanism for railway cars, e combination with a swinging door hav- a hook seat formed thereupon of a hook voted upon the car body and adapted to pportingly engage the said door seat, the id hook being provided with a supporting dge, the point thereof lying at a greater stance from the pivot point of the hook an the root of the said ledge, the said hook at being so formed that when the ledge of e said hook is in partial engagement erewith the door will be held in a partly osed position, and that when the said dge is in complete engagement therewith e door will be held in a fully closed posi- on, the said ledge and the said door seat formed to cause lifting of the door when e hook is moved from partial to complete gagement with the said door seat.

3. In a door arrangement for railway cars, e combination with a swinging door hav- a hook-engaging seat formed thereupon a door-supporting hook pivoted upon the r body, the door-engaging ledge of the id hook being provided with a knobbed int adapted to engage a co-operatively rmed surface on the forward edge of the id door seat to support the door in a partly closed position, other portions of the said ledge and seat being cooperatively formed in such manner that movement of the hook into further engagement with the door will effect further closing of the door.

4. In a door arrangement for railway cars, the combination with a swinging door having a hook-engaging seat formed thereupon of a door-supporting hook pivoted upon the car body, the door-supporting ledge of the said hook being formed along an inclined path, eccentric to the axis of swing of the hook, and the door seat being formed along a path conforming substantially thereto, the forward edges of the hook ledge and the seat being provided with interengaging shouldered portions adapted to support the door in a partly closed position, said shoulders lying within the limits of the normal contour lines of the respective members.

5. In a door arrangement for railway cars, the combination with a swinging door having a hook-engaging seat formed thereupon of a door-supporting hook pivoted upon the car body, the door-supporting ledge of the said hook being formed along an inclined path eccentric to the axis of swing of the hook, and interlocking shoulders formed upon the hook ledge and the door seat, the same being arranged to assume interengaging position when the hook is in full engagement with the door seat, and being adapted to resist retraction of the hook from position beneath the door seat, along the said inclined path.

In testimony whereof I affix my signature.

BYERS W. KADEL.

B. W. KADEL.

DOOR MECHANISM FOR RAILWAY CARS.

APPLICATION FILED FEB. 2, 1922.

1,434,953. Patented Nov. 7, 1922.

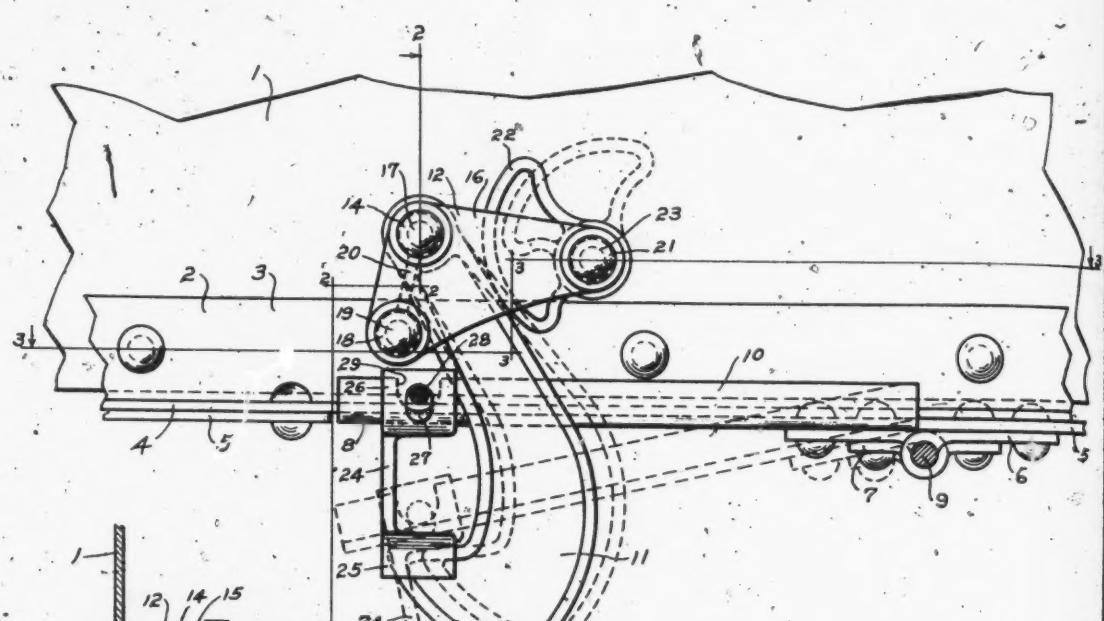


Fig. 1.

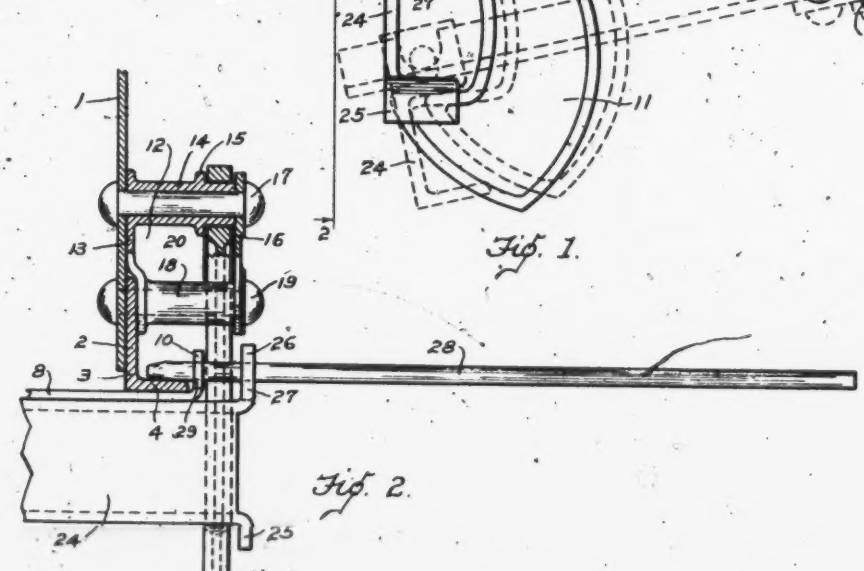


Fig. 2.

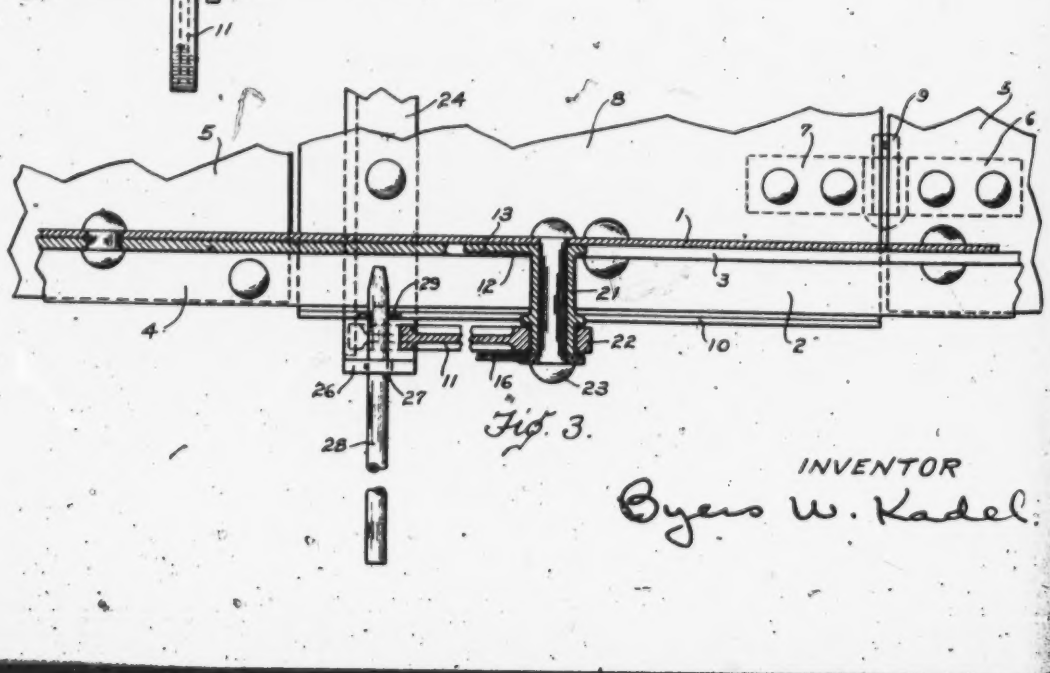


Fig. 3.

INVENTOR

Byers W. Kadel.

UNITED STATES PATENT OFFICE.

BYERS W. KADEL, OF BALTIMORE, MARYLAND.

DOOR MECHANISM FOR RAILWAY CARS.

Application filed February 2, 1922. Serial No. [illegible]515.

all whom it may concern:

Be it known that I, BYERS W. KADEL, a ...izen of the United States, residing at ...ltimore, in the county of Baltimore and ...te of Maryland, have invented certain ...w and useful Improvements in Door ...echanisms for Railway Cars, of which the ...llowing is a specification.

This invention relates to a door mecha...sm for railway cars or the like, and has its particular object to provide a simple ...or supporting means so arranged that the ...or may be lifted up by hand to a partially ...sed position, and be then moved there...om to a completely closed position, the ...pporting mechanism being operable to ...pport the door either in the temporary ...sition or in the final position as desired.

...her objects are to provide a door support...g mechanism of simple form and economi... construction, and one not liable to be ...maged in the ordinary course of service, ...o to provide means whereby a lever or ...her power device may be utilized to force ...e door into fully closed position.

With such as general objects in view, and ...th other more specific objects as will ap...ar from the description, the invention ...nsists of the formation, combination and ...rangement of parts as will be herein de...ibed and particularly claimed.

In the accompanying drawings, which ...ow a preferred form of the invention, ...gure 1 is a fragmentary side elevational ...w of a car body, having a door in the ...or thereof, and in connection with said ...or, a supporting mechanism constructed ... accordance with the principles of the ...esent invention. Figure 2 is a transverse ...rtical sectional view taken through a por...n of the car and the door supporting ...chanism, approximately on the line 2—...2—2 of Figure 1. Figure 3 is a hori...ntal sectional view taken through a por...n of the car and through a portion of the ...or supporting mechanism, approximately ...the line 3—3—3—3 of Figure 1.

Referring to these drawings, the side of ... car is denoted by the numeral 1. Se...ed as by riveting to the lower outer side ...a angle 2, having an upright leg 3, which ... against the outer face of the side plate ...the car, and a horizontal outstanding leg ... The car has a floor 5 which may be ...ired in any suitable manner to the car ... Hinged to the car floor by co-operating floor and door hinges such as 6 and 7 is a door 8, a hinge pintle being indicated at 9. In the present embodiment, the outer edge of the door plate is shown as extending outwardly beyond the edge of the outstanding leg 4 of the angle 2, and being there flanged upwardly to provide a sealing flange 10. The door is arranged to swing about the pintles, such as 9, to open or closed positions, it being the intention that the door shall be lifted by hand to close the same. It is not always possible in doors of this character to lift the door completely shut by hand, as the doors sometimes become warped, and foreign material sometimes lodges at a point that may interfere with the closing of the door. It is always possible, however, to lift the doors nearly closed by hand, and the present invention accordingly includes the provision of means for supporting the door in a preliminary position, and also in a completely closed position. To this end, a door supporting hook 11 is pivotally mounted upon the car body through the medium of a bracket 12. The bracket 12 has a plate portion 13, which lies against the car side or against the leg 3 of the angle 2. This bracket is provided with a spool portion 14, having a collar 15 surrounding the same at a point removed from the plate portion 13. A hub extends outwardly from the outer face of the collar 15, and the upper pierced end of the hook 11 is accommodated upon this hub, so that the hook 11 may be swung about this hub as an axis of rotation. A separate plate 16 overlies the hook and a rivet 17 passes through this plate 16 and through a pierced opening through the hub and spool 14, and also through a suitable registered opening in the side of the car, thereby securing the plate 16 against the end of the hub, and retaining the hook in position between the inner face of the plate 16 and the outer face of the collar 15, and at the same time securing the bracket and entire mechanism to the side of the car.

A plain pierced spool 18 is provided near the lower edge of the bracket, and the plate 16 also overlies this spool or boss, and a rivet 19 passes through these parts, and through the upright leg 3 of the angle 2, and through the car side plate 1 thereby providing additional means for securing the various parts together. The boss 18 is so arranged as to provide a limit stop for the hook 11 to pre-

vent its swinging too far to one side, where it would interfere with the closing of the door. The rib 20 connects the spool 14 and the spool 18, thereby stiffening these two portions of the bracket, and tying them more securely to the plate portion 13 thereof.

A pawl 22 is also pivoted upon a similar spool 21, this spool being practically a duplicate of the spool 14, including the collar and the hub portion. The pawl 22 may accordingly be rotated about the hub portion of the spool 21 as a center, and the pawl being eccentric in shape, it may be driven into position behind the hook 11 to hold the same in engagement with the locking face provided therefor on the door. A rivet 23 passes through a pierced opening in the spool 21, and through the plate 16 and through the side of the car 1, for additional securing purposes.

Secured to the under face of the door 8 is a channel iron 24, which is disposed with its web vertical, and its flanges horizontal, the upper flange lying directly beneath the door plate and the lower flange lying at some distance below the line of the door plate. The hook 11 is so arranged that when the door is lifted up, the supporting face of the hook may drop into position beneath the uppermost flange of the channel 24, thereby supporting the door in a temporary position, not fully closed. This position of the door and of the hook is shown in dotted outline in Figure 1. The door may now be lifted or forced up to its final position, when the locking face of the hook will drop into position beneath the lowermost flange of the channel 24. This position of the hook and door, is shown in full outline in Figure 1.

It will be noted that the outer end of the lowermost flange of the channel 24 is turned down as at 25 to provide a stop for the hook to prevent it from being accidentally displaced, longitudinal of the door, from its position beneath the lowermost flange of the channel. It will be noted also that the upper flange of the channel 24 is turned upwardly as at 26. An opening such as 27 is provided in this up-turned portion 26, through which a temporary lever, such as 28 may be inserted. The inner end of this lever may be positioned upon the outstanding leg 4 of the angle 2, and by then lifting upwardly upon the outer end of the lever 28, the door may be forcibly lifted from the preliminary position to its final position, the lever reacting against the upper side of the hole 27 as a shoulder, and the inner end of the lever reacting downwardly on the leg 4 of the angle. In order to admit the lever when the door is in partly closed positio portion of the flange 10 of the door ma cut away as at 29.

The lever 28, which extends outside of clearance of the car, is detachable, an fact, an old bolt, or anything readily hand, may be used instead of a speci shaped lever for this purpose.

I have thus described an embodimen the present invention. Other embodim are contemplated within the scope of appended claims without departing f the spirit thereof.

What I claim is:

1. A door mechanism for railway car cluding a door hinged to the car body, m for supporting the door in partly closed fully closed position, a ledge formed u the car body adjacent an edge of the d a shouldered bracket carried by the door jacent the said ledge, the shoulder of bracket and the said ledge being so for and associated as to accommodate a rem able lever operable therebetween for f ing the door from partly closed to f closed position.

2. A door mechanism for railway cars cluding a door hinged to the car body channel secured to the door and having end thereof extending beyond an edge the door, a hook pivoted upon the car arranged to seat beneath either flange of said channel, the hook being so arran and proportioned that when seated ben one of the said flanges, the door will be in partly closed position, and when se beneath the other flange, the door will held in fully closed position.

3. A door mechanism for railway cars cluding a door hinged to the car body bracket secured to the door, the same ha two supporting faces formed thereupon, one in advance of the other, and a door s porting member carried by the car body arranged for supporting cooperation w either of the said supporting faces.

4. A door mechanism for railway cars cluding a door hinged to the car body door-securing member operably mou upon the car body, and a plurality of f formed upon the door, each arranged independent co-operation with the said securing member to hold the door in a ferent position, adjacent portions of the body and the door being so formed and ciated as to accommodate removable m operable therebetween for forcing the from one of said positions to the other.

In testimony whereof I affix my signa

BYERS W. KADE

DISCLAIMER.

1,434,953.—*Byers W. Kadel*, Baltimore, Md. DOOR MECHANISM FOR RAILWAY CARS. Patent dated November 7, 1922. Disclaimer filed July 14, 1928, by the patentee, assignee, *The Wine Railway Appliance Company*, consenting.

Hereby enters this disclaimer to claim number 3 in said specification, which is in the following words, to wit:

"A door mechanism for railway cars, including a door hinged to the car body, a bracket secured to the door, the same having two supporting faces formed thereupon, the one in advance of the other, and a door supporting member carried by the car body and arranged for supporting cooperation with either of the said supporting faces."

[*Official Gazette August 7, 1928.*]

71

B. W. KADEL.

CAR DOOR MECHANISM.

APPLICATION FILED APR. 10, 1922.

1,434,954. Patented Nov. 7, 1922.

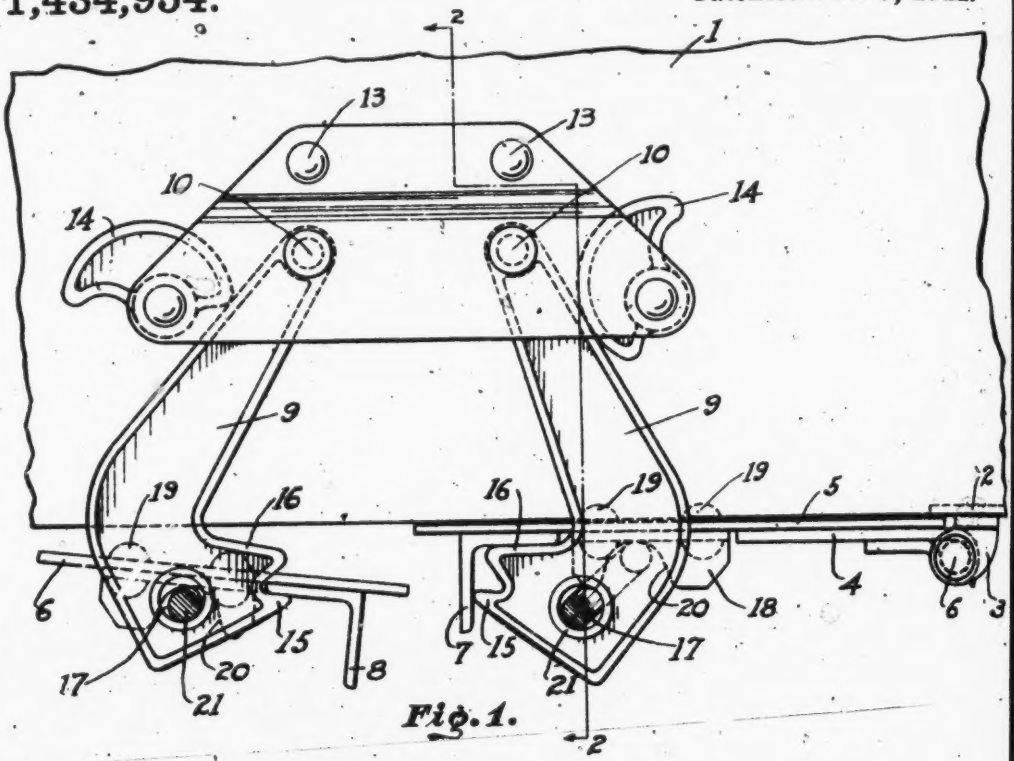


Fig. 1.

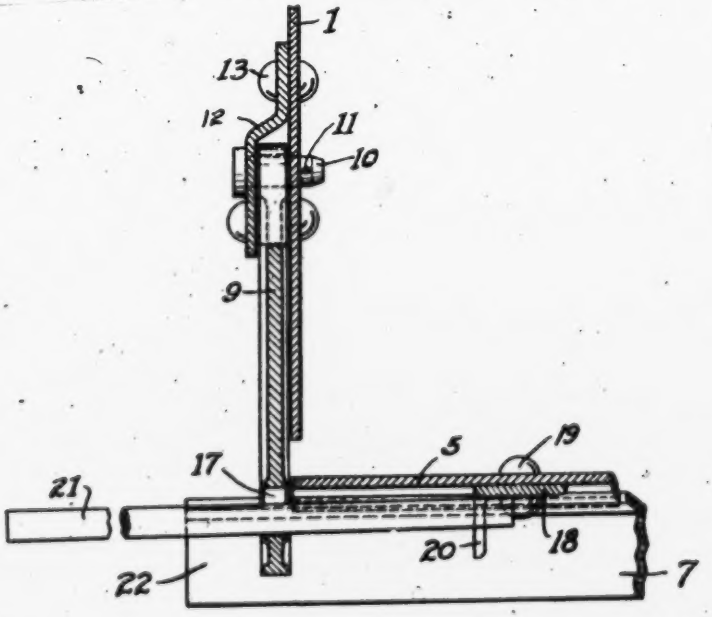


Fig. 2.

INVENTOR

Byers W. Kadel.

Patented Nov. 7, 1922. 1,434,954

UNITED STATES PATENT OFFICE.

BYERS W. KADEL, OF BALTIMORE, MARYLAND.

CAR-DOOR MECHANISM.

Application filed April 10, 1922. Serial No. 551,131.

To all whom it may concern:

Be it known that I, BYERS W. KADEL, a citizen of the United States, residing at Baltimore, in the county of Baltimore and State of Maryland, have invented certain new and useful Improvements in Car-Door Mechanisms, of which the following is a specification.

This invention relates to a door device for railway cars and has among its objects to provide a simple form of door closing and supporting mechanism. Another object is to provide a door supporting device wherein the door may be lifted by hand to a temporary position and then be forcibly closed, and thereafter the supporting mechanism be forcibly moved into final supporting position. Another object is to provide, with a door, a swinging door hook having a lever aperture therein, which aperture may serve not only as a lever fulcrum for forcing the door shut, but may also serve as a reaction point for the lever in forcibly swinging the hook into or out of engagement with the door.

With these and other objects in view, the invention consists of the formation, combination and arrangement of parts as will be herein described and particularly claimed.

In the accompanying drawings, which show a preferred form of the invention, Figure 1 is a fragmentary side elevational view, showing a portion of a car body equipped with a door mechanism embodying the principles of the present invention. Figure 2 is a transverse vertical section of the same, this view being taken approximately on the line 2—2 of Figure 1.

Referring now to these drawings, the side of the car is indicated by the numeral 1, and a fragment of the floor of the car is shown at 2. Hinged in the floor of the car by means of co-operating body and door hinges 3 and 4 is a door 5, the hinge pintle being indicated at 6. The door in the present embodiment is shown as swinging transversely of the car. There is also shown a fragment of a similar door 6, which may be arranged with the door 5 to constitute a pair of drop doors. Extending along the free edges of these doors are angle iron stiffening members 7 and 8 respectively. The ends of these stiffening members extend beyond the edges of the doors where they are utilized, as at 22, to form a door supporting arm for cooperation with a swinging door supporting member, such as the hook 9. One of the hooks 9 is provided for each door, and these are pivoted to the car body by means of the pintles 10. A bracket 12 overlies the outer faces of the upper portions of the hooks, and the pintle 10 extends through this bracket and through the car side 1. Cotter pins, such as 11, may be utilized to prevent the loss of the pintles 10. Additional rivets, such as 13, may also be utilized to secure the bracket 12 to the car side. Cams 14 of the customary type may also be supplied to hold the hooks in engagement with the doors.

The door supporting hooks 9 are each provided with a preliminary supporting ledge 15, and a final supporting ledge 16. It is contemplated that the doors shall be lifted by hand to positions upon the preliminary ledge 15. The door to the left in Figure 1 is shown in this preliminary position. Each hook is provided with an aperture 17 which is arranged substantially at right angles to the plane of swing of the hook. Each door is also provided with a lever seat 18 which may be riveted to the door as by means of rivets 19. These lever seats may be formed of a short length of angle iron with the down-standing leg thereof notched out as at 20. The removable lever 21 may be inserted through the aperture 17 and the inner end of this lever positioned upon the lever seat. The inner end of the lever should preferably lie within the cut out opening 20 of the lever seats so as to avoid slippage of the lever.

With the door in the partly closed position shown to the left in Figure 1, the lever 21 is inserted through the apertures 17, and the end of the lever is positioned within the cut 20 as desired. By now bearing down upon the outer end of the lever 21, it will be noted that the lever will fulcrum upon the hook 9 and the inner end of the lever will react upwardly upon the lever seat 18, thus forcing the door completely shut. With the outer end of the lever held down, and the door thus held shut, the outer end of the lever may be swung along the side of the car, thereby forcibly swinging the lever into final locking position with the ledge 16 beneath the horizontal leg of the angle 7. The notch 20 prevents slippage of the lever, and causes the hook to swing, instead of allowing the inner end of the lever to move.

The same operation may be followed when it is desired to release the door from the fully closed position to the preliminary position, which is sometimes desirable in cases where the contents of the car must be thawed out in cold climates.

It will be seen that I have provided, in a very simple manner, a door mechanism which can be readily operated without expensive apparatus, for completely closing or partially opening the doors, and furthermore, that all these operations can be done without danger of injury to the operator. The device is simple and is not liable to get out of order. Furthermore, the weight of the car is greatly reduced by the simplicity of the mechanism and the cost is also exceedingly low.

Having thus described an embodiment of my invention, what is claimed is:

1. In a door mechanism for railway cars, the combination with a swinging door of movable means operatively associated between the car body and the door for supporting the door in partly closed or in fully closed position, a lever seat formed upon the door, and an aperture formed in one of the door supporting members, the same being arranged to receive and form a fulcrum for a removable door-closing lever.

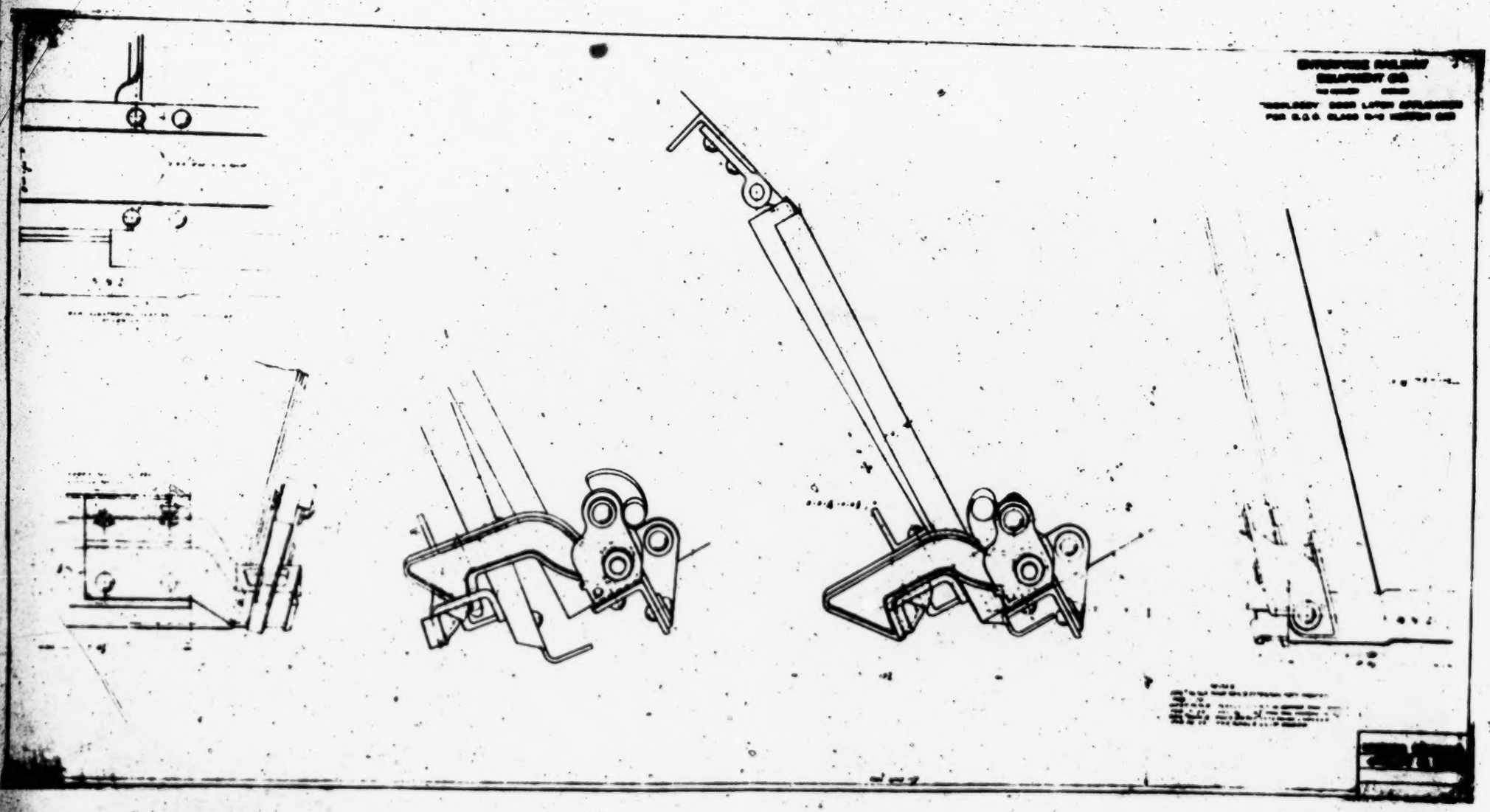
2. In a door mechanism for railway cars, the combination with a swinging door of a hook pivoted upon the car body and adapted to supportingly engage the door, a lever seat formed upon the door adjacent the hook, the said hook being provided with an aperture so arranged with respect to the lever seat on the door that a door-closing lever may be inserted there-through for cooperation between the said hook and the said lever seat to force the door shut and also to forcibly swing the hook.

3. In a door mechanism for railway cars, the combination with a swinging door of a hook pivoted upon the car body and adapted to supportingly engage the door, a lever seat affixed to the door, an aperture formed in the door hook with the axis thereof at right angles to the plane of swing of the hook, said aperture being adapted to accommodate a removable lever, enterable therethrough and engageable at its inner end with the lever seat, the said lever seat being arranged to hold the inner end of the lever against movement relative to the door in a door-closing direction, and also in the directions of the swing of the hook.

In testimony whereof I affix my signature.

BYERS W. KADEL.

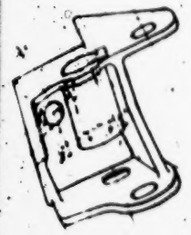
Enterprise No. 9
J. H. A. Patent
4.24.31
p. 193 Jointed Bars

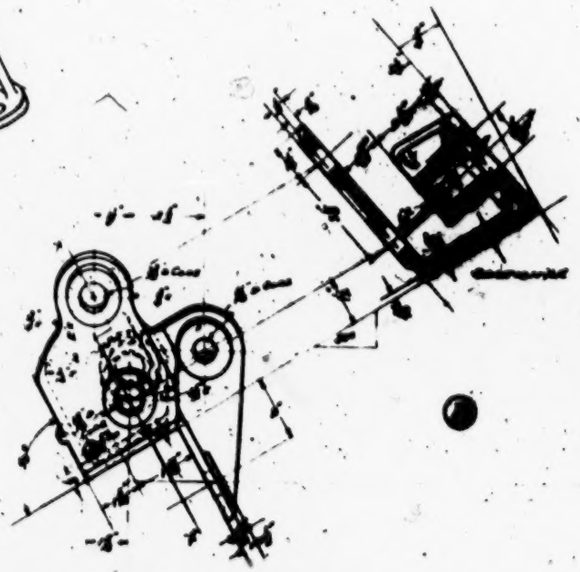


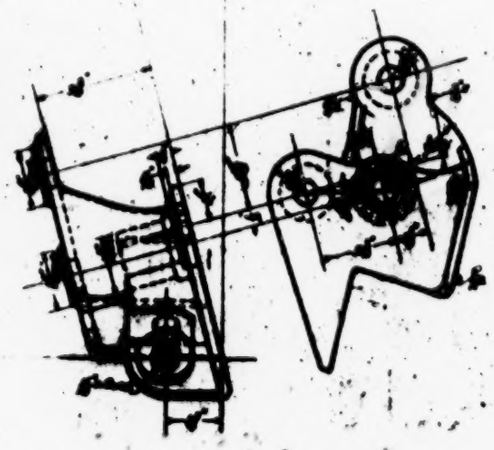
Enterprise No. 1
J. W. Griffin
4, 24, 31

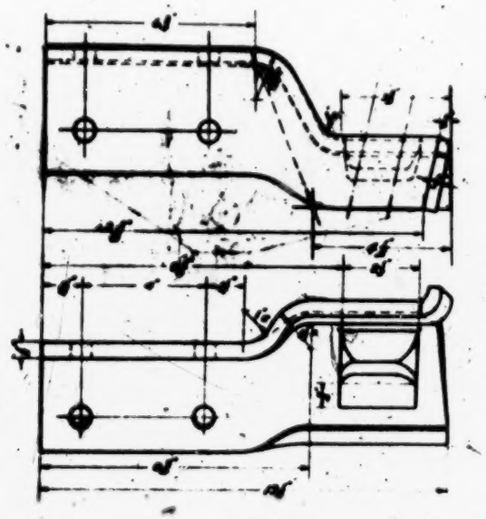
ENTERPRISE RAILWAY EQUIPMENT CO.

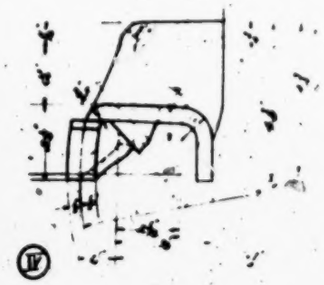
"WOOLDSBY" DOOR LATCH DETAILS FOR B. & O. CLASS N-12 HOPPER CAR

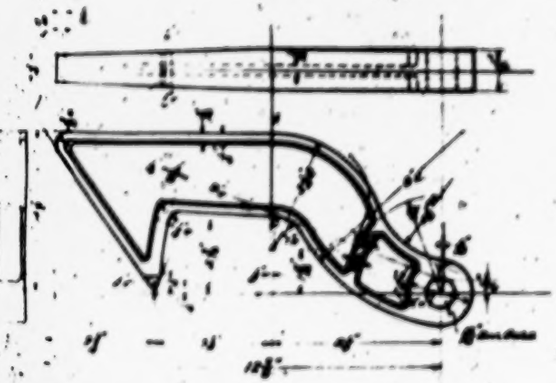










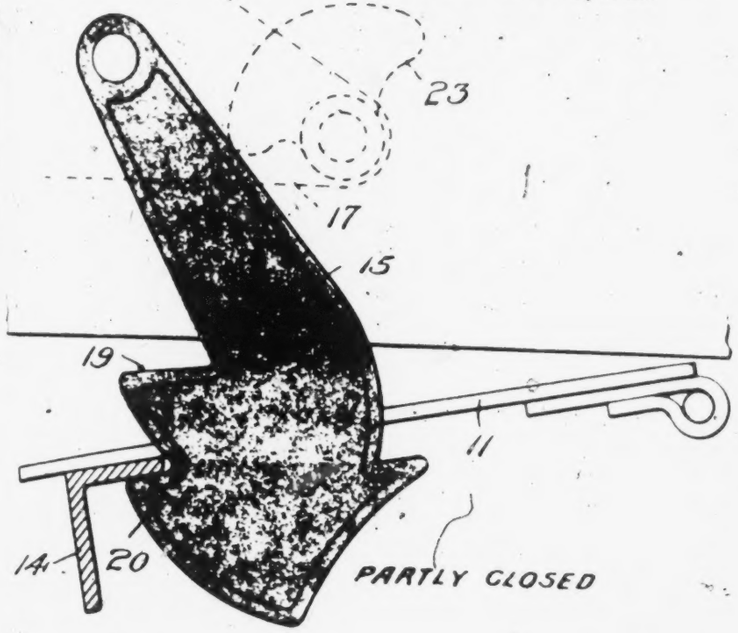


DRAWING NO. 3987A
FEBRUARY 1 1928

COMPARISON DRAWING

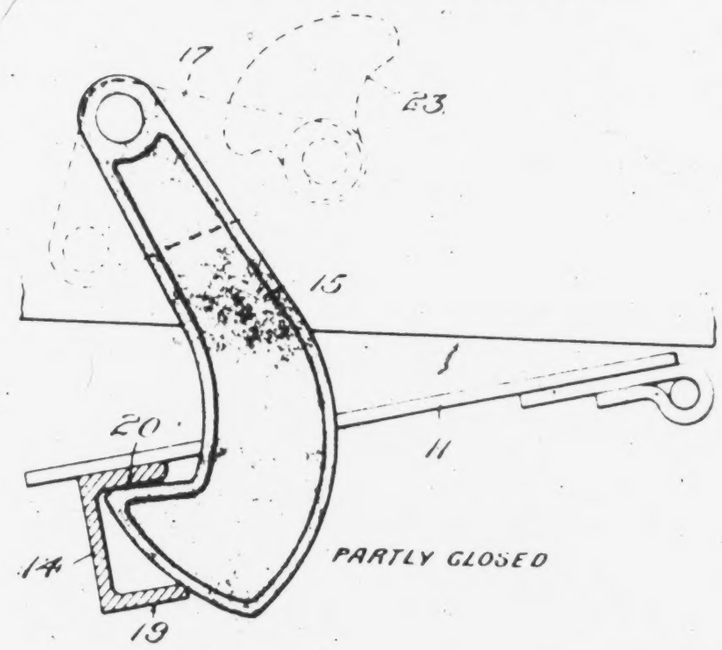
FLAT BOTTOM HOPPER CARS

CREMEAN REISSUE NO. 15,360



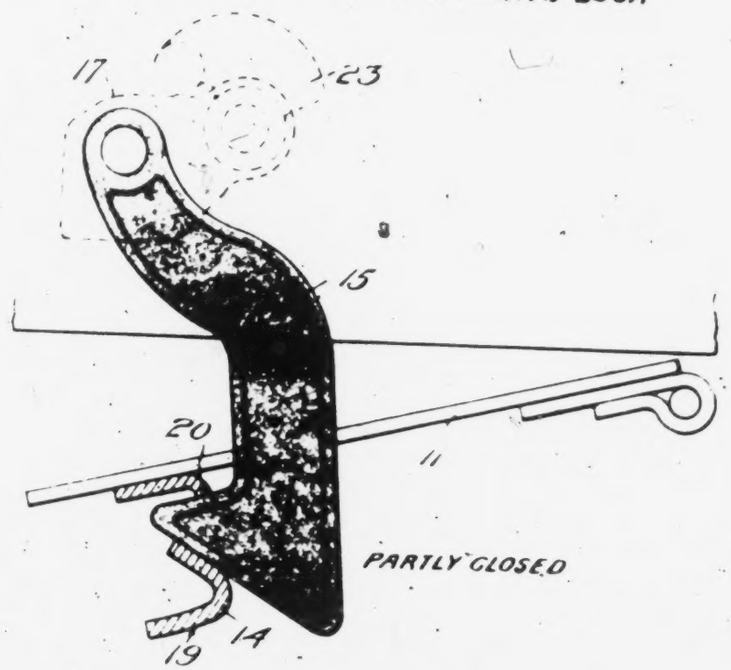
PARTLY CLOSED

KADEL PATENT NO. 1,434,953



PARTLY CLOSED

ENTERPRISE INFRINGING LOCK



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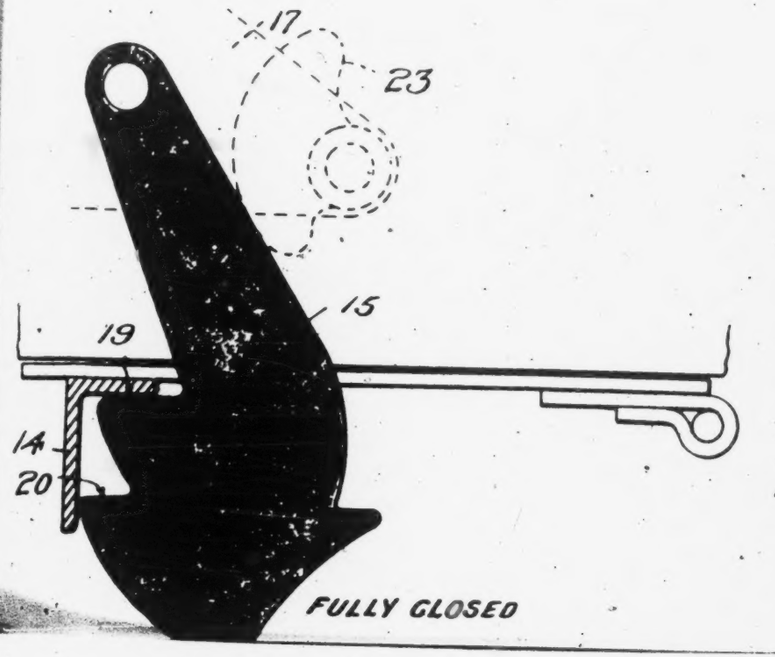

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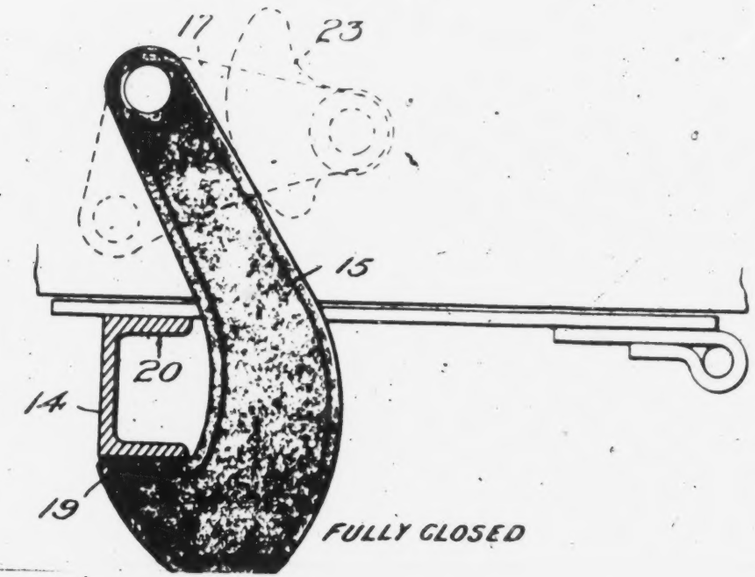

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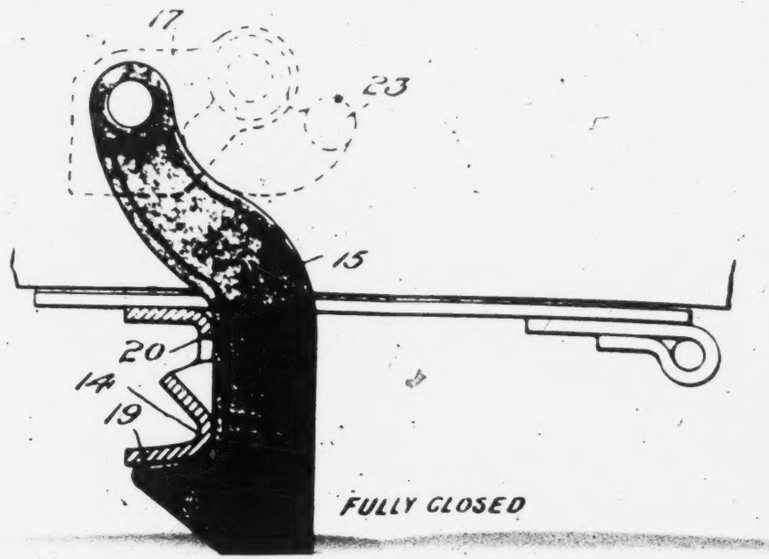


FULLY CLOSED

ENTERPRISE EXHIBIT No. 12

June
5th,
1923.

Mr. R. V. Sage,
c/o Bethlehem Steel Company,
Bethlehem, Pennsylvania.

Messrs. R. V. Sage and R. E. Wilder

Gentlemen:

We herewith enclose our check for Two Thousand Dollars ($2000.00) covering royalty at fifty cents per car on door flanging as per your patent No. 1,204,692. This covers Baltimore and Ohio 55-ton Hopper cars as follows:

1000	built	by	the	American Car & Foundry Company	at	Berwick, Pa.
500	"	"	"	Standard Steel Car Company	"	Butler, Pa.
1500	"	"	"	Pressed Steel Car Company	"	McKees Rocks, Pa.
500	"	"	"	Ralston Steel Car Company	"	Columbus, Ohio
500	"	"	"	Youngstown Steel Car Company	"	Niles, Ohio

For your information, in our October report there will be 1100 General Service cars for the Southern Pacific Railroad Co.

With kind regards, I am

Very truly yours,

President.

AC/ID

ENTERPRISE EXHIBIT No. 13

AGREEMENT

THIS AGREEMENT, Made this 30th day of June, A. D. 1922, by and between RALPH V. SAGE of Philadelphia, Penna., and RALPH E. WILDER of Johnstown, Penna., parties of the first part, and ENTERPRISE RAILWAY EQUIPMENT COMPANY, an Illinois corporation having offices at Chicago, Illinois, party of the second part, WITNESSETH, That:

WHEREAS, the parties of the first and second part heretofore entered into a certain license agreement with respect to United States Letters Patent 1,204,692, dated November 14, 1916 for Improvement in Door Bracing, Door Flanging, etc., said license agreement bearing date of December 15, 1917; and,

WHEREAS, the parties hereto are mutually desirous of entering into another agreement to supersede said license agreement of December 15, 1917.

NOW, THEREFORE, in consideration of One Dollar ($1.00) each to the other party in hand paid and of other good and valuable considerations, receipt of which is hereby mutually acknowledged, it is mutually covenanted and agreed by and between the parties hereto, as follows:

FIRST: Said license agreement of December 15, 1917 has been and hereby is cancelled and abrogated by mutual consent.

SECOND: Subject to such license or shop right as the parties of the first part have or may have heretofore given or granted to the Cambria Steel Company and the Pennsylvania Railroad Company, said parties of the first part hereby grant unto the party of the second part ENTERPRISE RAILWAY EQUIPMENT COMPANY, a sole and exclusive license under said patent 1,204,692 to make, sell and use or have made, sold and used, at the direction of said company, door bracing and door flanging embodying the inventions described and claimed in said pattnt 1,204,692, at a royalty of Fifty Cents (50c) per car.

Other features which pertain to door operating mechanism, and shown in said patent, are not included in this agreement.

THIRD: Said party of the second part agrees, during the term of said Letters Patent, or until the same is held invalid by a court of competent jurisdiction, to pay said RALPH V. SAGE and RALPH E. WILDER, jointly, the sum of Fifty Cents (50c) per car for all cars whereon the said door bracing and door flanging may be jointly used in the manner claimed in said Sage and Wilder patent 1,204,692, and which cars are built by or under the instructions, authority or permission of said party of the second part or its assigns or legal representatives.

FOURTH: Said party of the second part agrees to keep full, true and accurate books of account, showing all cars built under its direction, authority, instruction or permission, having the aforesaid combined door bracing and door flanging used thereon and subject to this license agreement, and to render unto said RALPH V. SAGE and RALPH E. WILDER, jointly, full, true and correct reports in writing on the fifteenth (15) days of January, April, July and October of each year, for the preceding quarter, if said party of the second part has availed itself of this license during said quarter, and to make payment of said royalty of Fifty cents (50c) per car on the days aforesaid for all cars on which said combined door bracing and door flanging in the manner claimed in said patent, has been used during the preceding quarter.

FIFTH: It is mutually agreed that whenever the second party shall sell door operating mechanisms to a railroad company, car builder or other customer or authorizes or permits such railroad company, car builder or other customer to build cars, and desires to have said combined door bracing and door flanging claimed in said patent, used therewith or thereon—then if the first parties shall have already granted a license under their said patent to such railroad company, car builder or cus-

tomer, the second party shall not be required to pay any license fee or royalty to the first parties. Unless, in certain cases, said second party desires to assume said obligation for the railroad company, car builder or other customer holding such license, and then only by special understanding mutually satisfactory to the parties to this agreement. In such event, the second party shall pay the royalty of Fifty cents (50c) per car, as hereinbefore agreed upon.

SIXTH: In making royalty payments as hereinbefore provided for, the party of the second part claims the right to make a joint check payable to both RALPH V. SAGE and RALPH E. WILDER and deliver same to either of them, said check, when endorsed by either or both said RALPH V. SAGE and RALPH E. WILDER, to constitute a sufficient reecipt of full payment to both. This clause may be modified wreheby the individual interests of RALPH V. CAGE or RALPH E. WILDER may be satisfied separately, in the event of such an arrangement later becoming mutually satisfactory to all parties concerned.

SEVENTH: In and for the same considerations hereinbefore mentioned, the parties of the first part have sold, assigned and set over and by these presents do sell, assign and set over unto the party of the second part, all of their right, title and interest in and to all rights of action, legal and equitable, to recover for past infringements of said Letters Patent 1,204,692, and also to recover for any future infringements of said Letters Patent as fully as the same would have been enjoyed by the parties of the first part had this agreement not been made.

EIGHTH: The parties of the first part also hereby give and grant unto the party of the second part the right to recover and bring suit in the name of the second party to recover for such past infringements and future infringements.

NINTH: The parties of the first part hereby agree upon proper request in writing made by the second party, to join as parties complainant in any suit to recover for past infringements or future infringements of said Letters Patent when, in the opinion of the party of the second part, such joinder of parties shall be deemed necessary or advisable. But nothing in this paragraph shall be construed as obligating parties of the first part to legal expenses in connection with any suit brought.

RALPH V. SAGE

Witness: H. B. Mainhart

RALPH E. WILDER

(Parties of the First Part).

Witness: John Woodchok

ENTERPRISE RAILWAY EQUIPMENT COMPANY

By ARGYLE CAMPBELL

President.

(Party of the Second Part).

Attest:

N. M. GOLSMITH

Secretary.

R. V. SAGE & R. E. WILDER.

CAR DOOR.

APPLICATION FILED FEB. 4, 1916.

1,204,692. Patented Nov. 14, 1916.

Fig. 1.

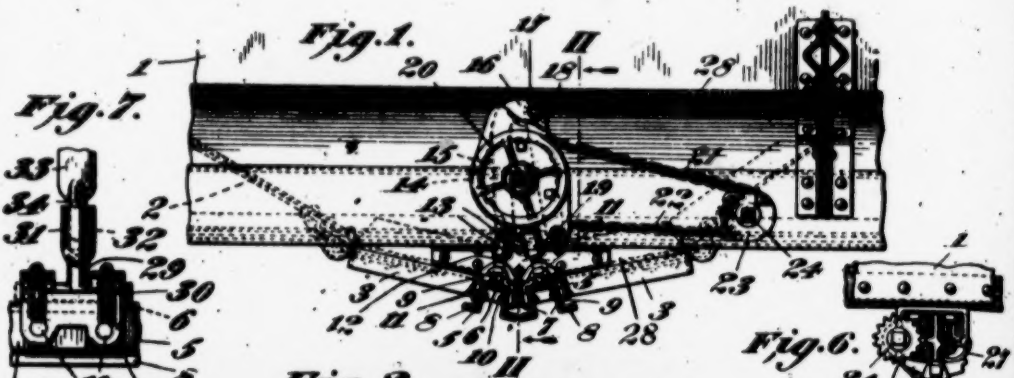


Fig. 7.

Fig. 6.

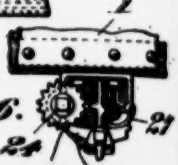


Fig. 2.

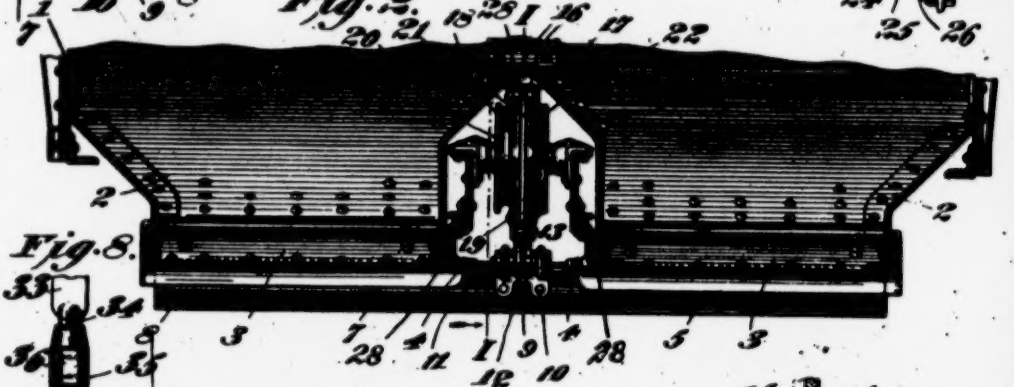


Fig. 8.

Fig. 3.

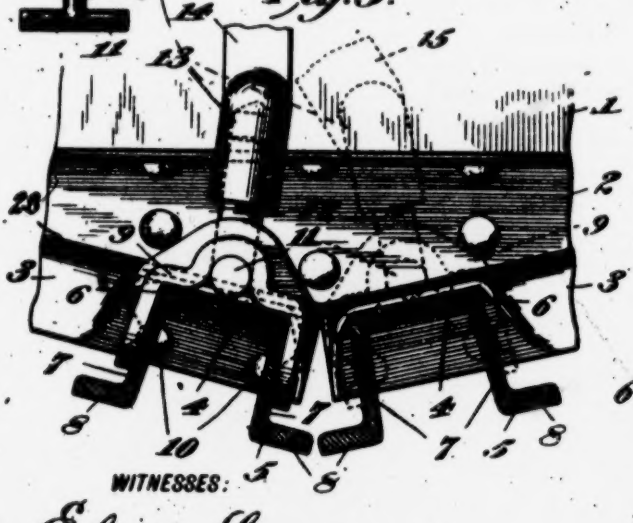


Fig. 4.

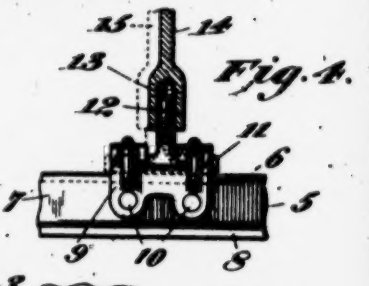
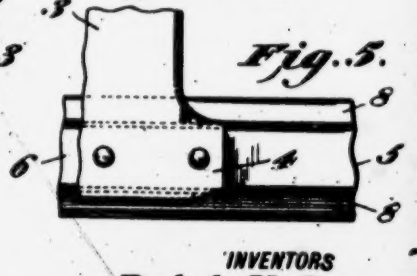


Fig. 5.



WITNESSES:

Elmer Seavey.

Fred A. Stahl.

INVENTORS

and Ralph V. Sage,
Ralph E. Wilder.

BY

Geo. E. Thackray

their ATTORNEY

UNITED STATES PATENT OFFICE.

RALPH V. SAGE, OF PHILADELPHIA, AND RALPH E. WILDER, OF JOHNSTOWN, PENNSYLVANIA.

CAR-DOOR.

1,204,692. Specification of Letters Patent. Patented Nov. 14, 1916.

Application filed February 4, 1916. Serial No. 76,106.

To all whom it may concern:

Be it known that we, RALPH V. SAGE, residing at Philadelphia, county of Philadelphia, and RALPH E. WILDER, residing at Johnstown, county of Cambria, both in the State of Pennsylvania, citizens of the United States, have invented certain new and useful Improvements in Car-Doors; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to the construction of car doors with particular reference to metallic doors used on dumping cars; to forming the doors of pressed steel in a particular way to minimize the amount of material used for stiffening and strengthening the same; in utilizing the door members for adding to the rigidity thereof without the use of unnecessary and extraneous parts, thereby also lightening and cheapening the construction; and to other ends as will hereinafter appear.

Referring now to the annexed sheet of drawings which forms part of this specification;—Figure 1 is a vertical longitudinal sectional elevation through a portion of a hopper bottom car taken on the line I—I Fig. 2; Fig. 2 is a vertical transverse sectional elevation taken on the line II—II Fig. 1. Fig. 3 is a vertical longitudinal sectional elevation on a larger scale, illustrating the manner of attaching the links to the spreader bars and the spreader bars to the doors, the left hand section of this figure being taken in front of the clevis member and the right hand section being taken behind the clevis member; Fig. 4 is a side elevation and section showing the manner of attaching the links to the spreaders; Fig. 5 is a detail of the corner portion of one of the doors illustrating the manner of attaching the doors to the spreader bar; Fig. 6 is a detail of the locking pawl and ratchet mechanism for locking the door operating shaft; Fig. 7 is an elevation showing in detail another manner of attaching the links to the spreader bars; and Fig. 8 is an elevation showing still another manner of attaching the links to the spreader bars.

Referring now to the characters of reference on the drawings:—1 represents the car in general, 2 one of the hoppers at the lower portion thereof, 3 are the doors which are preferably formed of pressed steel in the shape of a shallow pan or box with flanges projecting on all sides thereof. At the forward end of the doors, these flanges are formed upwardly at 4, as illustrated, and substantially in line with or in the same plane as the body or main plate portion of the door. 5 are spreader bars each illustrated as of rolled channel section with upper central portion 6, a pair of web portions 7 and a pair of flanges 8 projecting outwardly from the extremities of the webs, and, for the purpose of economy of design to produce greatest strength and stiffness, the central portion 6 and the flanges 8 are thicker than the webs 7, thereby providing more material at a distance from the neutral axis and making a stronger and stiffer section. By reason of the width of the spreader section in the direction of the flanges 8, this section is also very strong laterally as well as in the direction substantially parallel to the web portions.

The flanges formed on the forward portions of the doors may be omitted, as the door spreaders which are secured to the doors by rivets, as illustrated, may sufficiently stiffen and strengthen this portion.

Clevis portions 9, as illustrated, are riveted to the spreader bars by the rivets 10 and provided with an approximately semicircular bearing portion therein, adapted to receive the ends of the T-bolts 11 which are provided with the threaded shank portions 12, adapted to be screwed into the corresponding threaded sockets 13 which are provided on the ends of the supporting links 14 and 15. The bent upper ends of the links 14 and 15 are indicated as 16 and are provided with pivots 17. A straight link 18 is hinged to this pivot 17 and provided with pivot 19 at its other end, where-

by it is connected to the outstanding lug on the sheave 20. The sheave 20 is provided with a groove in its periphery, which groove may be provided with projections adapted to receive the operating chains 21 and 22 which are connected with the smaller winding sheave 23 which is mounted on the operating shaft 24. The end of the operating shaft 24 is provided with a ratchet wheel 25, adapted to be held in position desired by the pawl 26 provided with locking detent 27. The cover plate or central ridge of the car forming a portion of the hopper is illustrated as 28, and extends downwardly to form part of the door jamb.

Referring now to the connection between the lifting and lowering links and the door spreader bars, as illustrated in Fig. 7:—29 is a T-bolt with head 30, which is pivotally mounted in the clevis 9, which clevis is secured to the spreader bars 5, which spreader bars are secured to a pair of doors as illustrated. The upper end of this T-bolt or pivot bolt 29 has an upset or enlarged portion 31 provided with an axial cylindrical opening 32 therein, provided with an internal screw. The link in this case is illustrated as 33, formed of a bar of flat steel or other section as desired and has a cylindrical end 34, provided with an external screw-thread which is screwed into the internal thread in the projecting end 31 of the bolt. This provides a simple connection and one which enables the links to be lengthened or shortened as desired, to properly adjust the tight closing of the door.

Referring now to the connection of the links to the spreader bar and doors, as illustrated in Fig. 8:—The link 33 is provided with a cylindrical end 34 having an external screw-thread thereon, this being a left-hand thread, while the shank 12 of the T or pivot bolt is provided with a corresponding right-hand thread. These two portions are adjustably connected together by means of the sleeve-nut 35 with internal opening 36, the upper end of the same having an internal left-hand screw thread and the lower end an internal right-hand screw thread to correspond with the portions to which they are secured thereby. In order to adjust the length of the links to properly close the doors in accordance with the construction shown in Fig. 8, this is readily done by turning the sleeve-nut 35 either clockwise or reverse clockwise to lengthen or shorten the links.

Referring now to the Figs. 1, 3 and 4:—When it is desired to adjust the doors so that they will close tightly and to allow for wear, slack or deflection of any of the parts, the pin or pivot 17 is withdrawn from the projection on the sheave 20 and from the bent end 16 of the link and the link is turned around its axis to screw or unscrew it as desired on the threaded shank 12, and after this adjustment is made, the link and pin are replaced and secured in position.

The adjustment of the position of the doors and the length of the link corresponding to the illustration of Fig. 7, is accomplished in a similar manner, namely:—The pin 17 is withdrawn, the link 33 with its threaded end 34 is screwed into or out of the internally threaded socket 31 until the length is as desired, whereupon the pin is replaced through the upper end of the link and through the projection on the sheave 20 and secured in position. With the connection of the links to the T-bolts or pivot bolts as illustrated in Figs. 1, 2, 3, 4 and 7, when the pin 17 is in place, the links cannot rotate nor can the screw-threaded connection move so that an adjustment of this kind once made will not be changed by any jars or vibrations.

The adjustment of the lengths of the links of the construction shown in Fig. 8 is made by turning the sleeve nut 35 in either direction as desired, to lengthen or shorten the connection. The adjustment made with the construction shown in Fig. 8 can be easily accomplished at any time without removing any of the parts.

By referring to Fig. 2 it will be noted that each spreader bar 5 extends below and is secured to and connects a pair of doors, one on each side of the central longitudinal ridge of the car, the clevis 9 being secured to the spreader bar about midway of its length, while the major portion of the door operating mechanism is located within the hollow central longitudinal ridge of the car. When the doors are in the position as illustrated and it is desired to dump the contents of the car, a wrench is applied to the square end of the shaft 24, the detent 27 turned out of contact with the pawl 26 which is then released from contact with the tooth of the ratchet wheel 25 and the shaft either turned or allowed to turn in such a way that the doors drop down and discharge the load. After this is done the shaft 24 is turned in the opposite direction, thereby winding the chain 21 around the winding sheave 23, causing the sheave 20 to rotate clockwise, as viewed in Fig. 1, whereupon the links 14 are lifted upwardly and their bent ends ultimately rest upon the top of the projection shown on the sheave 20. When the doors are closed the pawl 25 is secured in place against one of the ratchet teeth by the detent 27 which is positioned as shown in Fig. 6. When the doors are closed and locked their weight does not affect the winding chains 21 or the operating shaft 24, but the weight of the doors is sustained directly on the sheave 20 by the bent ends 16 of the links 14 and 15.

It should also be noted that the lower

ends of the door links 14 and 15 are provided with simple screw-threaded connections to the spreader bar, thereby simplifying and lightening the construction in these respects as compared with other more complicated and heavier devices.

As compared with other constructions, our doors are very simple, with a few number of parts, light in weight, the door spreaders bearing directly against the body or flat plate portion of the door, as illustrated, while the downwardly projecting flanges on the sides of the spreader bars serve to further stiffen the doors and maintain them of proper shape to close and remain tight. The construction of the spreader bars with thicker flanges and top, and with thinner webs is a particular feature of our invention, conducing to lightness, strength and economy.

It will also be noticed that the doors close against the comparatively thin edges of the central ridge cover plate 28 and other similar thin edges of the plate on their other sides so that even should any dust of coal, limestone or other lading adhere to the doors, the doors when closing will cut through this material and seat themselves solidly against the hopper bottom, the metal portions contacting with the necessary tightness.

Although we have shown and described our invention in considerable detail, we do not wish to be limited to the exact and specific details shown and described, but may use such substitutions, modifications or equivalents thereof as are embraced within the scope of our invention or as pointed out in the claims.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:—

1. A dumping car door comprising a plate provided with a flange on each of the sides thereof, portions of said flange on two sides being formed upwardly in line with the door plate, a door spreader resting against the door plate and said upwardly formed flanges and secured thereto.

2. A dumping car door comprising a plate provided with flanges on the hinged and side portions thereof, portions of the side flanges being formed upwardly in line with the door plate, and a door spreader resting against the door plate and said upwardly formed flange portions and secured thereto.

3. In a dumping car, a pair of doors each hinged at one of their sides. each of said doors being formed of a plate with integral flanges on the edges thereof, portions of the side flanges being formed upwardly and approximately in line with the door plate, a door spreader resting against each door plate and the upwardly formed flanges thereof and secured thereto, and means secured to said door spreader for raising and lowering said doors as desired.

4. A pair of dumping car doors each composed of a plate provided with flanges on the hinged and side edges thereof, portions of the side flanges being bent upwardly, a door spreader secured within the offset portion so formed, and means secured to said spreaders for raising and lowering the doors.

5. A pair of dumping car doors spaced apart, provided with a door spreader of inverted U-section, with outstanding flanges, the central portion of the section being secured to the body portions of said doors, a clevis secured to the spreader between the doors and adapted to receive a pivoted bolt provided with a projecting threaded shank, a link member provided with an integral internally threaded end adapted to be secured to the threaded shank aforesaid, and means for operating said link members to open and close the doors.

6. A pair of dumping car doors spaced apart, provided with a spreader of inverted U-section with outstanding flanges secured thereto, through its central portion, clevis members secured to the intermediate portion of said spreader and provided with sockets, in which is mounted a pivot bolt provided with an upwardly projecting threaded shank, a link provided with an upset and internally threaded end adapted to receive the screw-threaded shank, and means for operating said link to open and close the doors.

7. A dumping door composed of a pressed pan-shaped plate with flanges on the edges thereof, portions of the side flanges being formed upwardly in line with the body portion of the door, a door spreader resting directly against the up-pressed portions of said flanges and the plate portion of said door.

8. A dumping door composed of a plate with flanges on the edges thereof, portions of the side flanges being bent upwardly, thereby providing a recess in said flanges, a door spreader mounted in said recess and secured to the door.

9. A door spreader comprising a metal bar of channel form with a pair of thin webs each slightly inclined toward the upper connecting portion, and flanges projecting outwardly from the extremities of said webs, the flanges being thicker than said webs.

10. A door spreader section of deep channel section with a pair of comparatively thin webs connected by an integral plate portion, a flange projecting outwardly from the other edge of each web portion, said flanges and plate portion being thicker than said webs.

11. The combination with a pair of car doors of a door spreader secured thereto,

comprising a metal bar of channel form, with a pair of webs integrally connected on one side by a central portion and with a flange projecting outwardly from the other extremity of each web portion, said flanges and central portion being thicker than the webs.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses.

RALPH V. SAGE.
RALPH E. WILDER

Witnesses:
LEONARD A. SEITZ, Jr.,
OLIVER B. HICKOX.

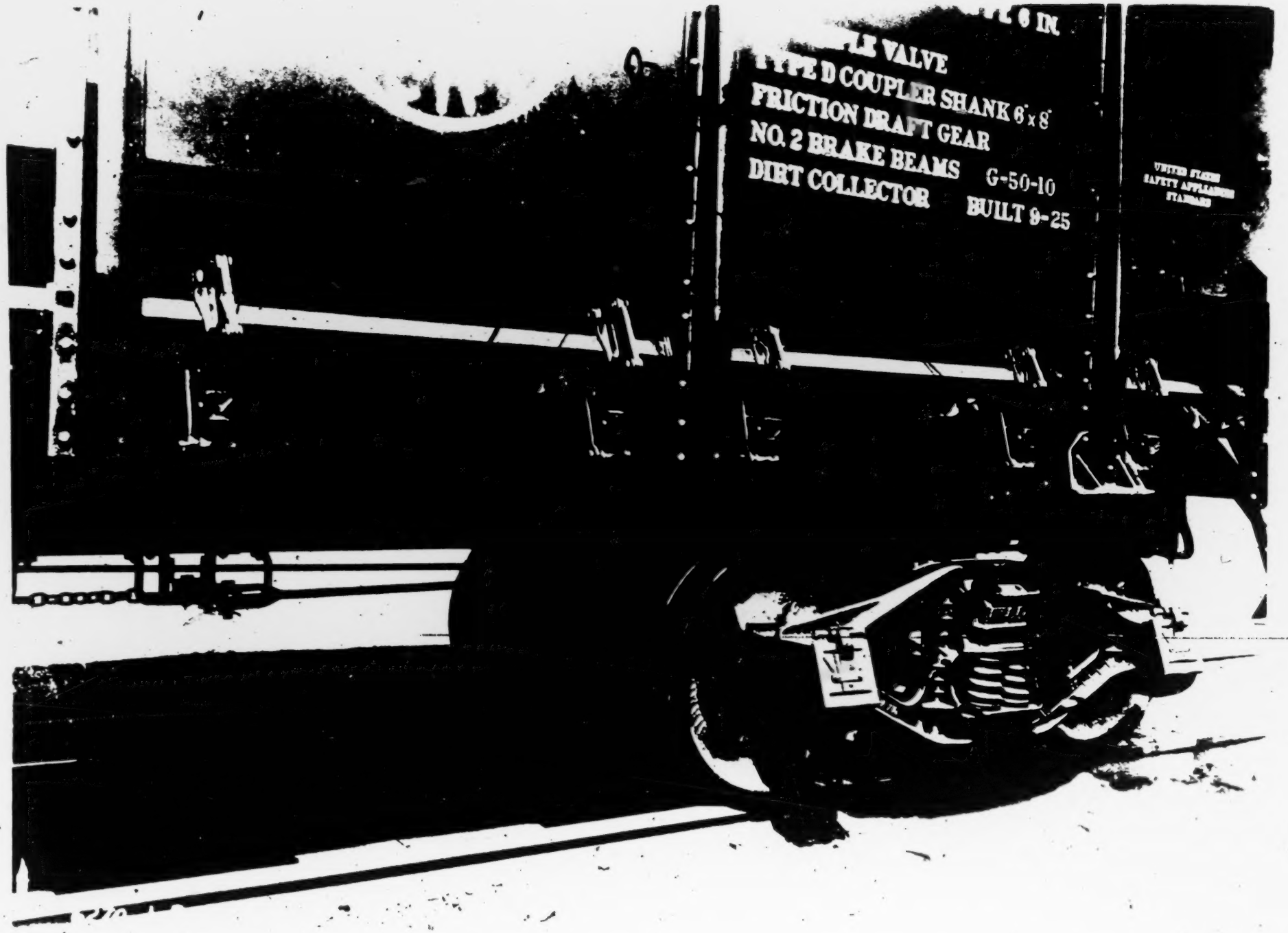
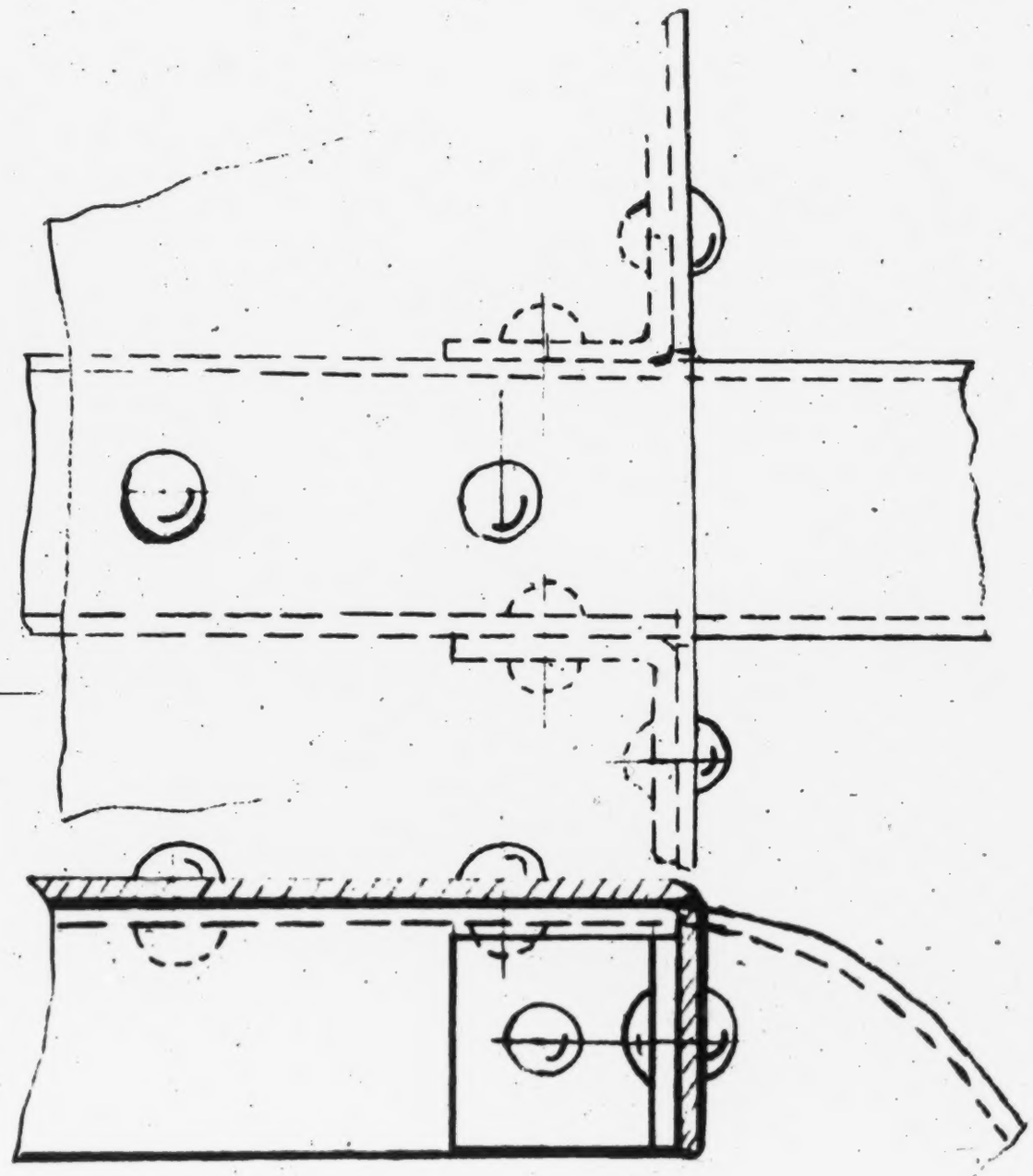
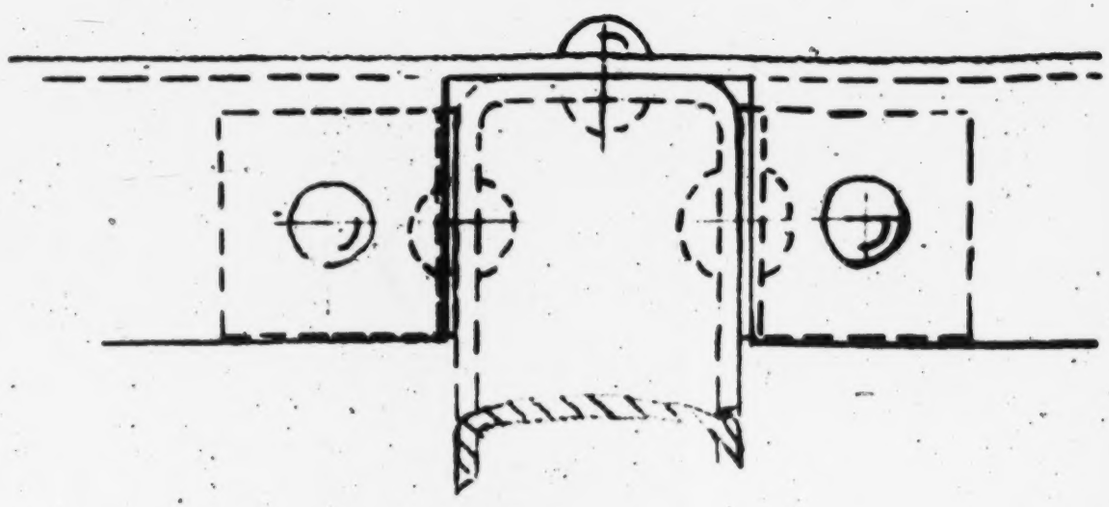

VALVE
D COUPLER SHANK 6 x 8
FRICTION DRAFT GEAR
NO. 2 BRAKE BEAMS G-50-10
DIRT COLLECTOR BUILT 9-25

Exhibit No. 16.
J. H. Hicks
4, 24, 31





Euler pic. no. 1
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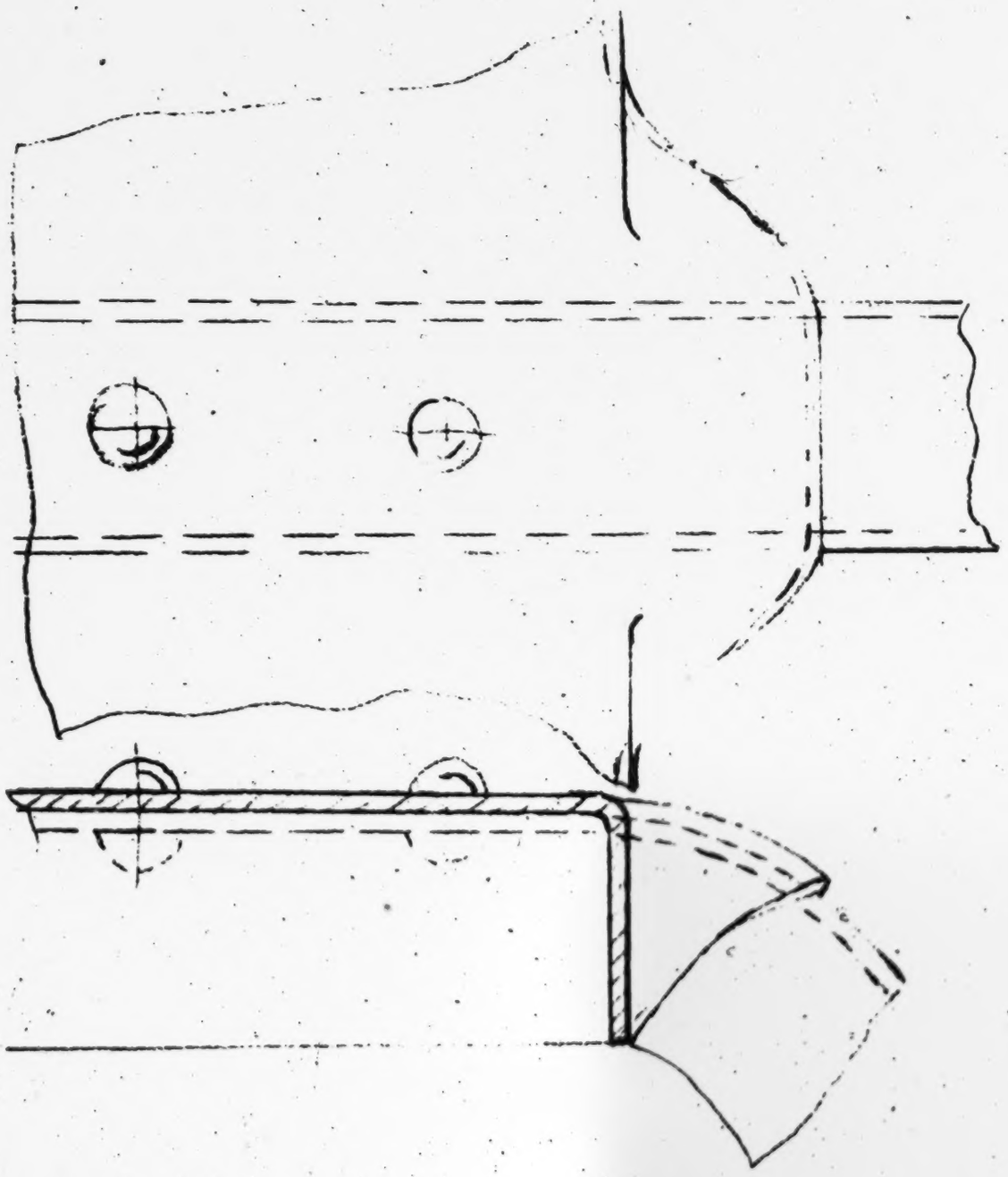
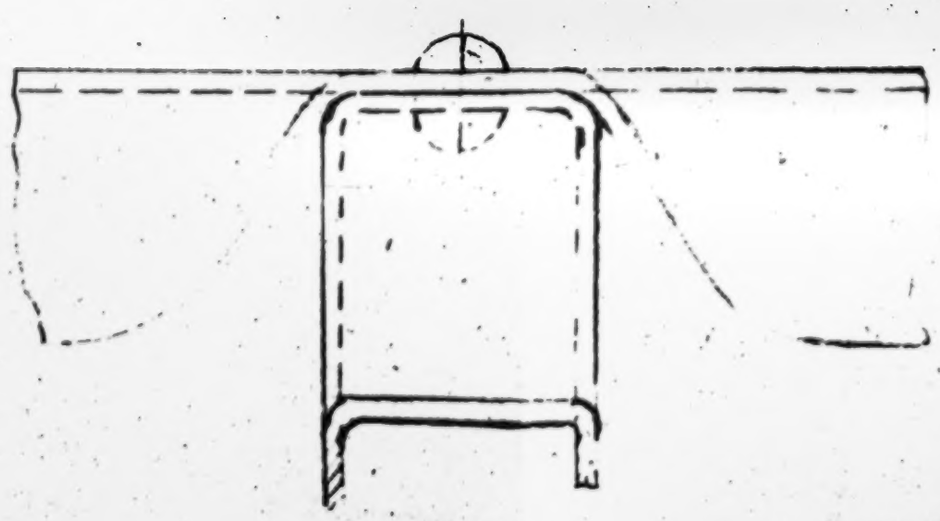
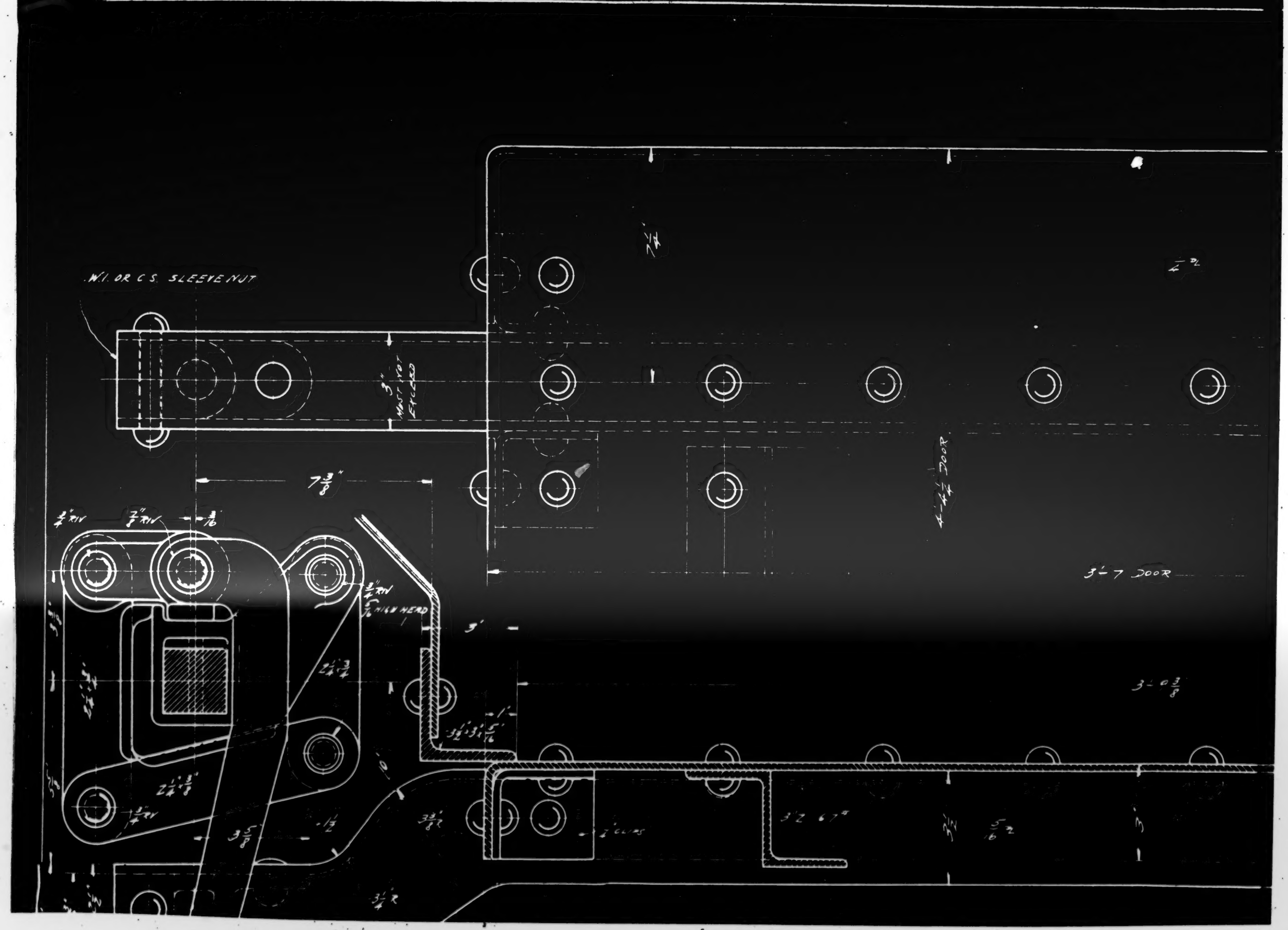





N.I. OR C.S. SLEEVE NUT
3" MUST NOT EXCEED
7 3/8"
3'-7 DOOR
3'-0 3/8
3'2 6 7/8
2 CLIPS

NI. OR C S SLEEVE NUT

3" MAST STOP WELDED

7 3/8"

3/4" RIV

3/8" RIV

1/2"

3/4" RIV
5/16 HIGH HEAD

2 1/4"

2 1/4"

1/2" RIV

1/2" STRAP

1 DIA PIN WITH WASHER & COTTER

4 7/8

3/4"

4-3/4" DIA R.

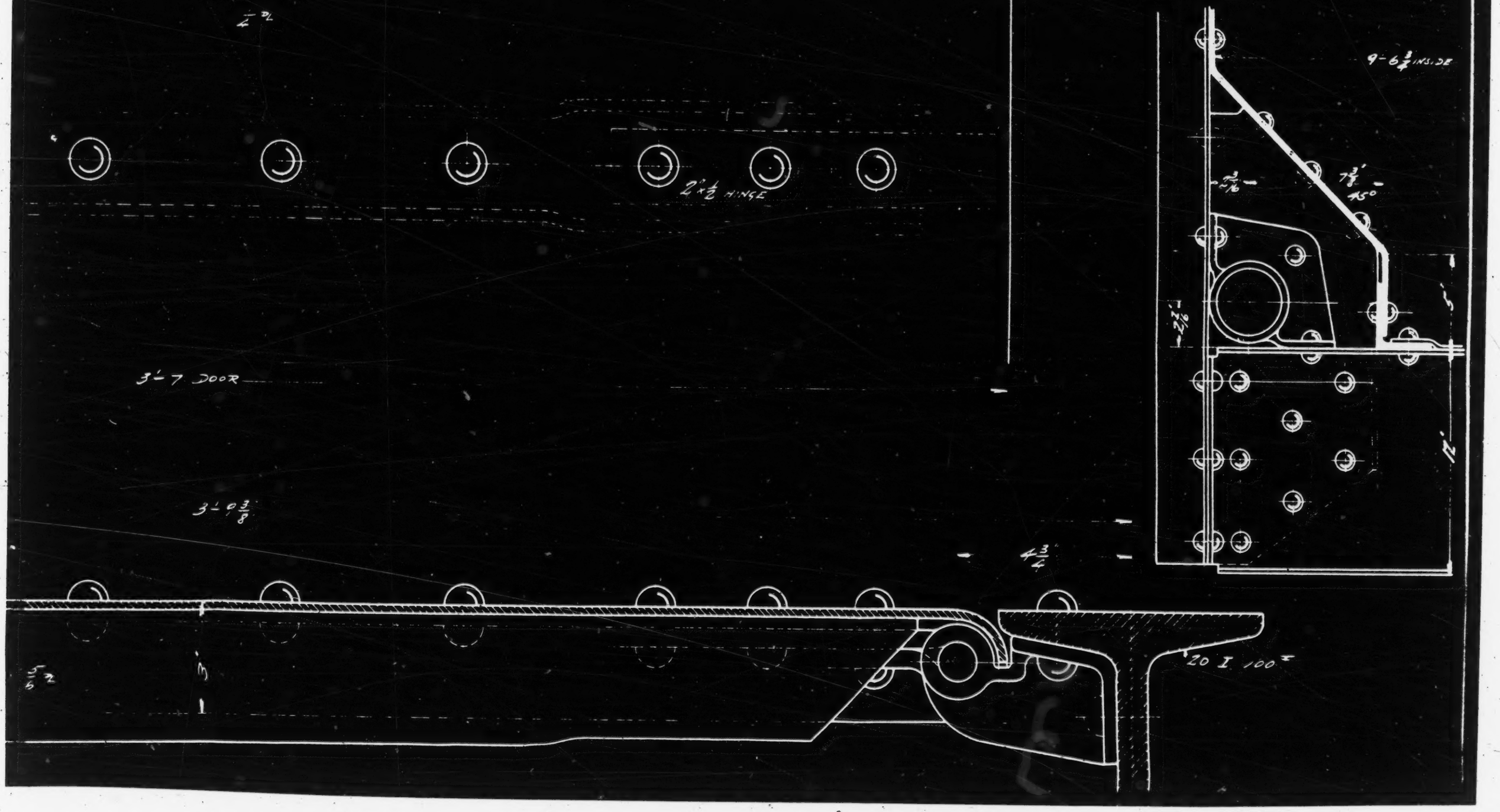
3'-7 DOOR

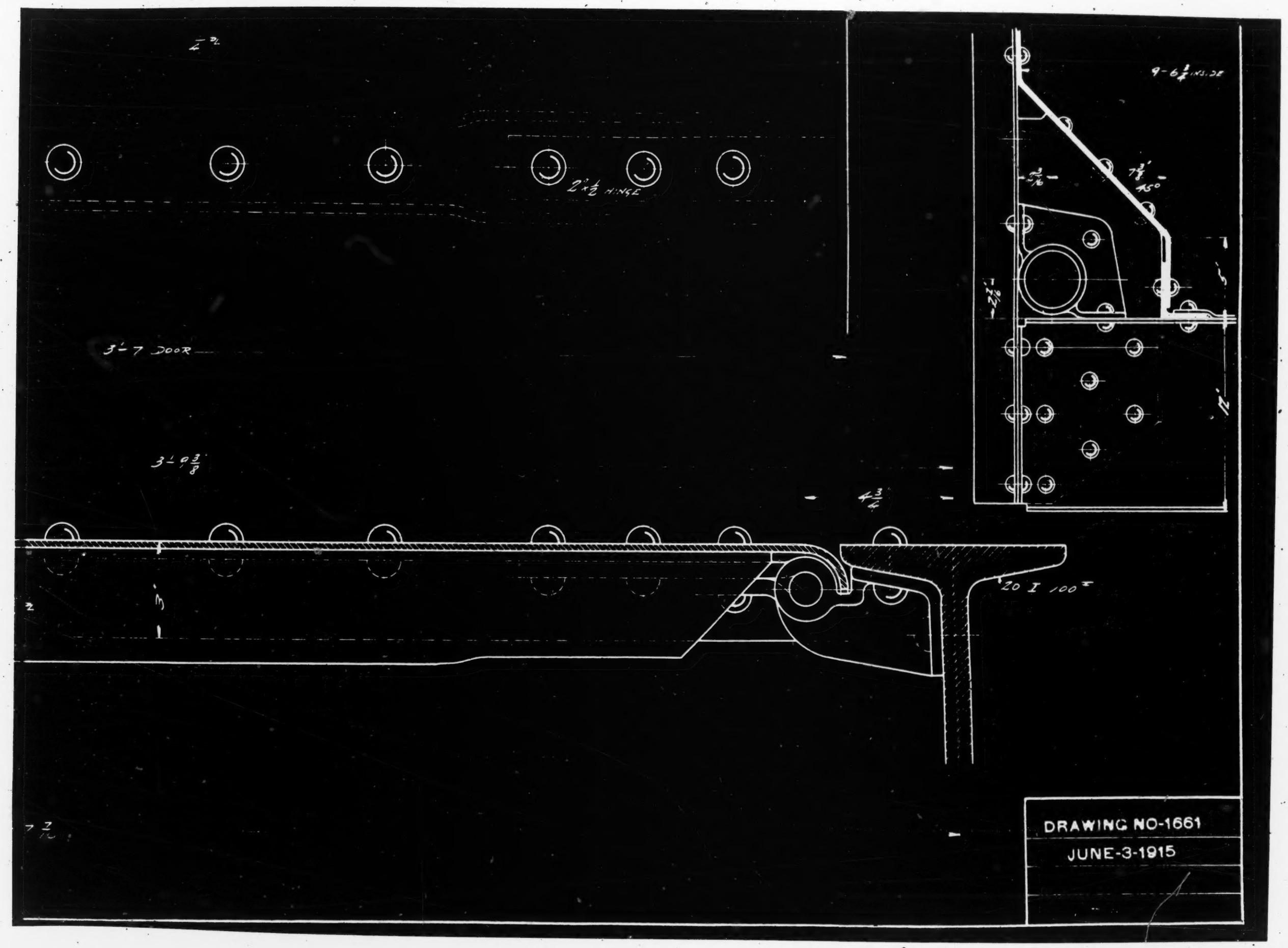
3'-0 3/8"

3" Z 67#

ENTERPRISE RAILWAY
EQUIPMENT CO
THE ROOKERY CHICAGO

DOOR OPERATING ARRANGEMENT




9-6¾ INS. DE
7⅞"
45°
2"x½ HINGE
3'-7 DOOR
3'-0⅜"
4¾
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DRAWING NO-1661
JUNE-3-1915

Enterprise No. 14
Jul 6
4.74.21

BUILT BY
PRESSED STEEL CAR COMPANY
PITTSBURGH, PA., U. S. A.

Pages 144, 145, 166, 167, and title page

Car Builders' Cyclopedia

Of American Practice

Definitions and Typical Illustrations of Cars, Their Parts and Equipment; Descriptions and Illustrations of the Tools and Methods Employed in Their Construction and Repair; Cars Built in America for Industrial Operations and for Foreign Railroads

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Enterprise General Service Ballast and Gondola Cars

Among the many special types of freight cars developed by the Enterprise Railway Equipment Company are General Service and Ballast cars. A tentative design is available from this company to accommodate whatever the conditions may demand, or a new plan incorporating the ideas of the users will be prepared if desired.

The name "General Service Car" immediately presents to mind a car suitable for many purposes and of the flat bottom gondola type. It is usually about 40 ft. in length, and has 16 doors in the bottom arranged to be lowered in sets of 4, discharging the load on both sides of the track.

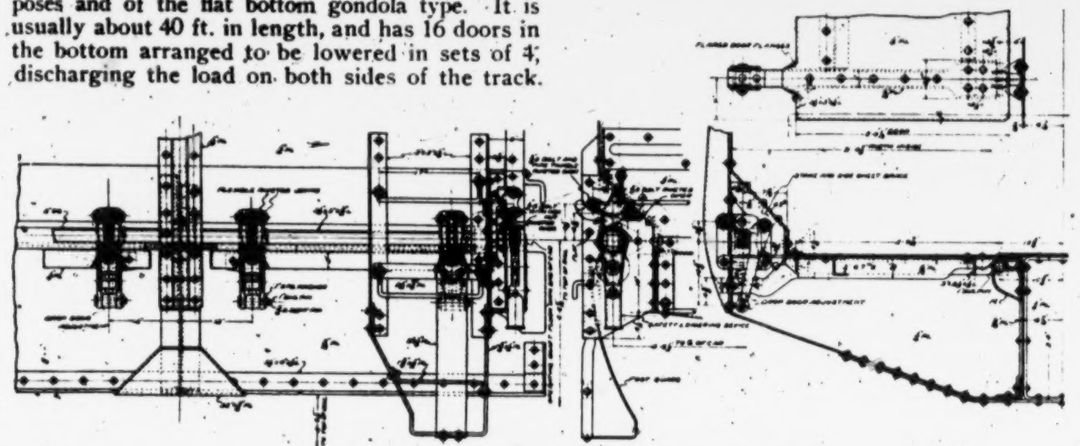

Fig. 78—Door Operating Mechanism for General Service Cars

Figs. 72 and 82 show respectively an all-steel and a composite design, both of which incorporate parts very generally accepted as essential to insure reasonable durability. It will be noted that the floors of these cars are sufficiently high to obtain proper door openings.

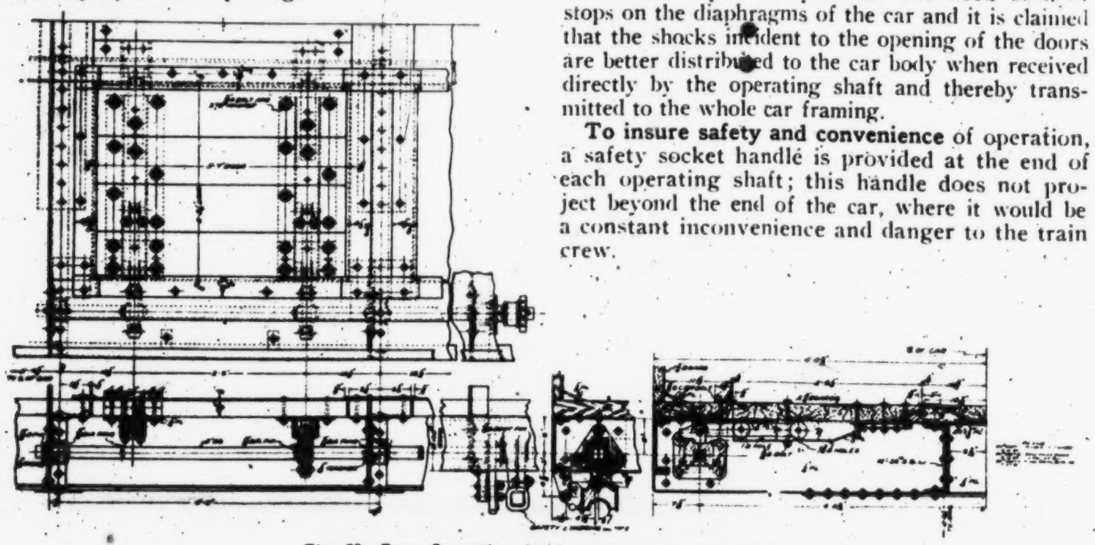

Fig. 79—Door Operating Mechanism for Gondola Cars

78. In this design the mechanism is located at the side of the car above the floor line; the advantage of such a location is that the mechanism lies out of the way of the discharging load, and the offset in the side of the car, with filler plates between the side and stakes, adds greatly to the strength of the car and insures against bulging sides.

The mechanism consists of square operating shafts with square hub links thereon, around which wind steel links flexibly riveted together. When in a closed position they form very positive locks for the car doors, to which they are attached by adjustable eyebolts, so that perfectly tight closing doors may be obtained. These links are sufficiently strong to support the doors in their locked position without the need of door stops on the diaphragms of the car and it is claimed that the shocks incident to the opening of the doors are better distributed to the car body when received directly by the operating shaft and thereby transmitted to the whole car framing.

To insure safety and convenience of operation, a safety socket handle is provided at the end of each operating shaft; this handle does not project beyond the end of the car, where it would be a constant inconvenience and danger to the train crew.

Enterprise General Service Ballast and Gondola Cars *Cont'd.*

ice car. Fig 79 illustrates a door plan for such a car with the door operating mechanism located below the car floor. The mechanism is very similar to that described above and includes the safety lowering device illustrated in Fig. 80.

Latch Equipment for drop doors is another

Fig. 80—Safety Lowering Device

product of this Company. These latches are serviceable for small doors which may be conveniently handled by a single operator. Such a door is illustrated in Fig. 81 together with two "Ingoldsby" Latches which securely support the

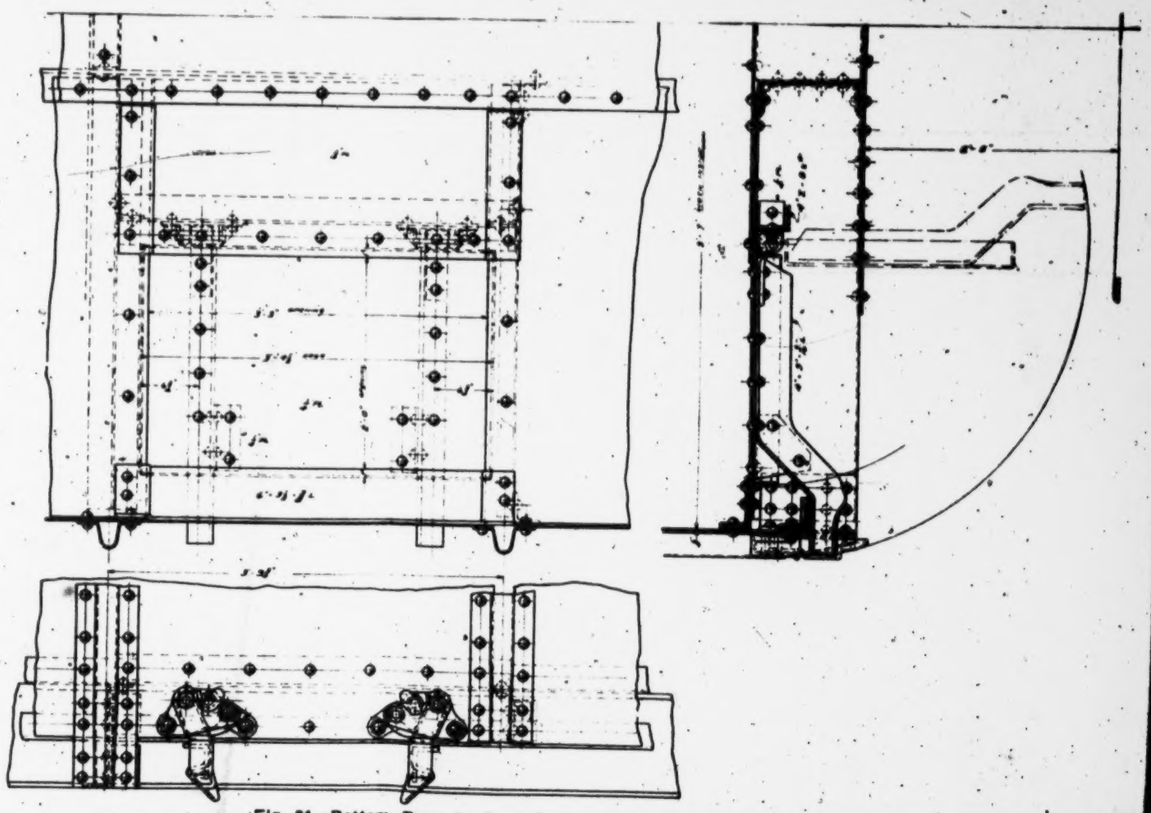

Fig. 81—Bottom Door in Gondola Car Fitted with Ingoldsby Latches

built car. The several cars shown in Figs. 68, 73 and 77 are designed to meet such requirements and have been provided with strong sides, continuous cross tie members and continuous center sill construction. Fig. 68 illustrates an all-steel car which may be arranged to operate either as a concentrated load, 100 percent-discharge ballast car, or as a 40 ft. gondola, suitable for hauling coal and other commodities. The arrangement of this car is such that the load may be discharged either to the center of the track or to both sides. The center doors are arranged for graduating the discharge so that ballast may be released in small quantities from a moving car and thus distributed along the roadbed.

The design of the convertible car, which is shown in Fig. 73, is such that a concentrated load of ballast may be distributed to the immediate center of the track in such quantities as desired by the operator, or it may be arranged as a flat floor gondola car suitable for carrying coal or for other purposes in which a fair proportion of the load may be dumped to the sides of the track. Fig. 77 is also a convertible car, which, in addition to the ballast features above mentioned, is suitable for plow service and has therefore

and Ballast cars. A tentative design is available from this company to accommodate whatever the conditions may demand, or a new plan incorporating the ideas of the users will be prepared if desired.

The name "General Service Car" immediately presents to mind a car suitable for many purposes and of the flat bottom gondola type. It is usually about 40 ft. in length, and has 16 doors in the bottom arranged to be lowered in sets of 4, discharging the load on both sides of the track.

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The mechanism consists of square operating shafts with square hub links thereon, around which wind steel links flexibly riveted together.

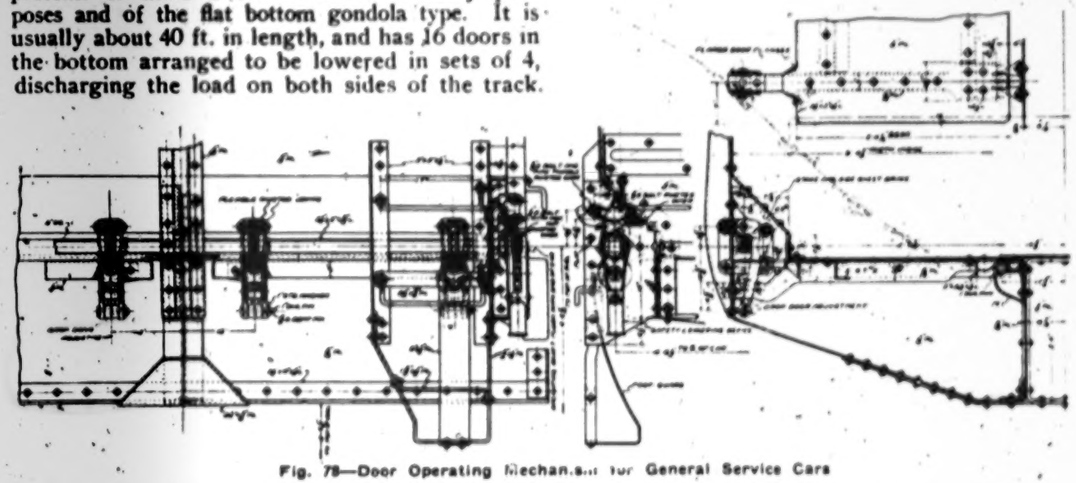


Fig. 78—Door Operating Mechanism for General Service Cars

Figs. 72 and 82 show respectively an all-steel and a composite design, both of which incorporate parts very generally accepted as essential to insure reasonable durability. It will be noted that the floors of these cars are sufficiently high to obtain proper door openings.

When in a closed position they form very positive locks for the car doors, to which they are attached by adustable eyebolts, so that perfectly tight closing doors may be obtained. These links are sufficiently strong to support the doors in their locked position without the need of door stops on the diaphragms of the car and it is claimed that the shocks incident to the opening of the doors are better distributed to the car body when received directly by the operating shaft and thereby transmitted to the whole car framing.

To insure safety and convenience of operation, a safety socket handle is provided at the end of each operating shaft; this handle does not project beyond the end of the car, where it would be a constant inconvenience and danger to the train crew.

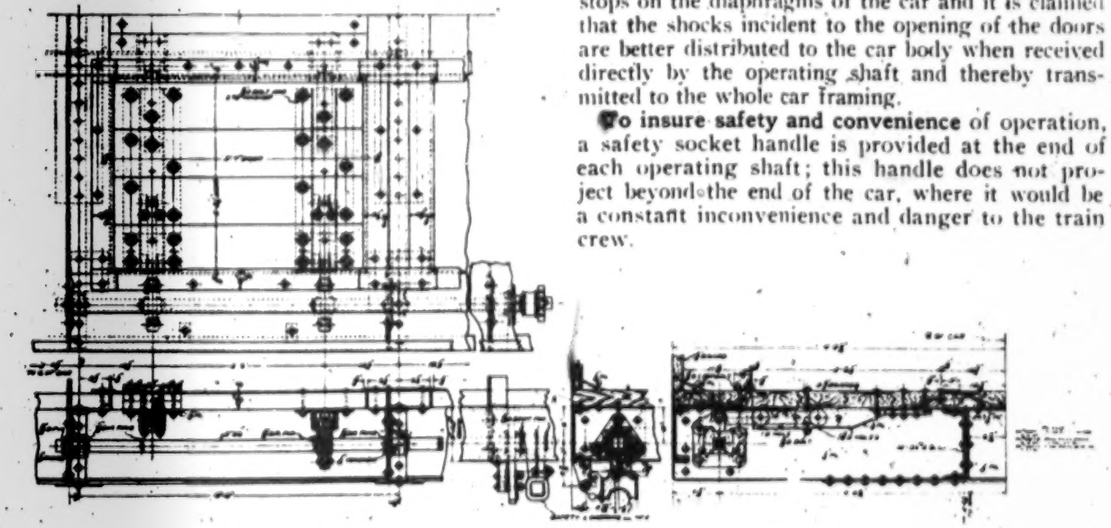


Fig. 79—Door Operating Mechanism for Gondola Cars

A method of applying door operating mechanism to general service cars, showing more particularly that portion near the end, is shown in Fig.

For gondola cars having doors only between the trucks the floor does not need to be as high above the rails as is required for the general serv-

ism is very similar to that described above and includes the safety lowering device illustrated in Fig. 80.

Latch Equipment for drop doors is another

Fig. 80—Safety Lowering Device

product of this Company. These latches are serviceable for small doors which may be conveniently

all-steel car which may be arranged to operate either as a concentrated load, 100 percent-discharge ballast car, or as a 40 ft. gondola, suitable for hauling coal and other commodities. The arrangement of this car is such that the load may be discharged either to the center of the track or to both sides. The center doors are arranged for graduating the discharge so that ballast may be released in small quantities from a moving car and thus distributed along the roadbed.

The design of the convertible car, which is shown in Fig. 73, is such that a concentrated load of ballast may be distributed to the immediate center of the track in such quantities as desired by the operator, or it may be arranged as a flat floor gondola car suitable for carrying coal or for other purposes in which a fair proportion of the load may be dumped to the sides of the track. Fig. 77 is also a convertible car, which, in addi-

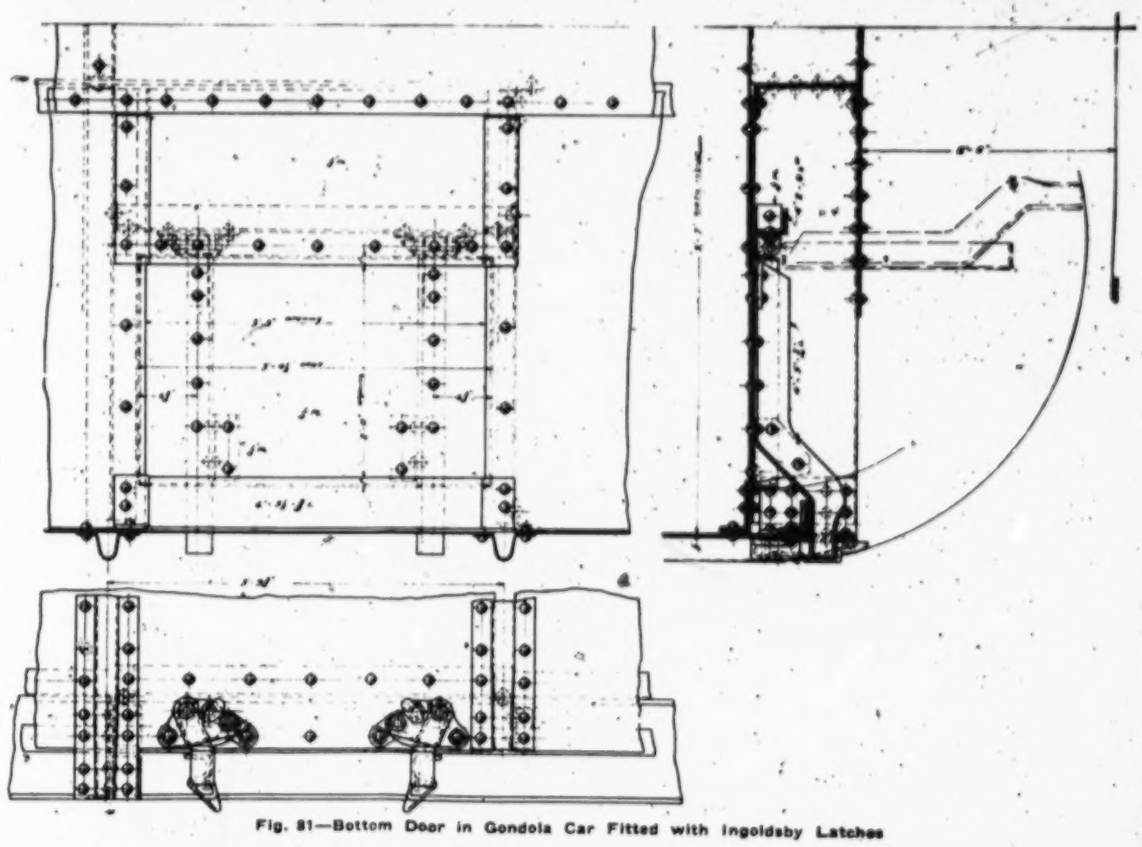


Fig. 81—Bottom Door in Gondola Car Fitted with Ingoldsby Latches

handled by a single operator. Such a door is illustrated in Fig. 81 together with two "Ingoldsby" Latches which securely support the closed door.

Ballast cars are subjected to such severe usage that it is necessary to have a very substantial well

tion to the ballast features above mentioned, is suitable for plow service and has, therefore, vertically hinged doors arranged in the sides of the car so that the material may be plowed from the car body to either side of the track.

Enterprise Hopper Cars and Attachments

The question of hopper car design to best meet a specified service is usually the subject of debate in the minds of railroad officers having such specifications to prepare. The Enterprise Railway Equipment Company, after spending many years in careful study and experimentation on the development of this type of car, with its door operating mechanisms, safety devices, etc., is prepared to submit designs, comparative data and such other information as desired to all users of such equipment.

There are three distinctive types of hopper cars which may be referred to as Side Discharge—Fig. 123, Center Discharge—Fig. 126, and Bottom Discharge—Fig. 127. The latter incorporates two types of doors, the vertically suspended door at the end section and the horizontal twin doors at the intermediate section. The cars illustrated are all of fifty-five tons capacity. Designs of similar seventy-ton cars of the same general types are available.

Equipment for hopper car doors of the vertically suspended type are shown in Figs. 119 and 120, representing two types of door operating mechanisms, known as type "C" and type "D," respectively; the detail parts of the two types differing [illegible] locking

The Safety Door Lowering Device illustrated in Fig. 121 is an important feature of both types "C" and "D" mechanisms and it has been found is of great importance as a preventive of accidents and has made injury to the operator impossible.

Fig. 121—Safety Door Lowering Device

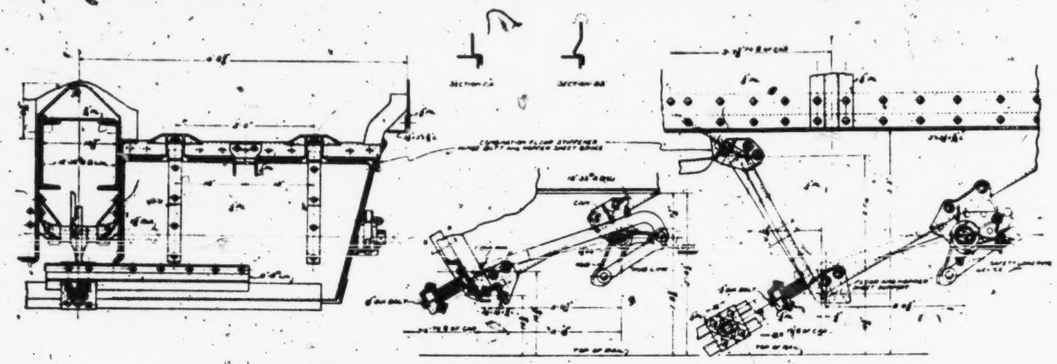


Fig. 119—Vertically Suspended Hopper Doors and Operating Mechanism, Type C

In conjunction with these door opening mechanisms there is illustrated in both Figs. 119 and 120 a recommended adjunct product, the Combination Floor Stiffener, Hinge Butt and Hopper Sheet Brace Casting. This member combines in one piece the hopper floor stiffener and the hinge butts; also includes a brace at the end which prevents tearing of the hopper sheet. The casting also provides a seal along the top edge of the car door and as the

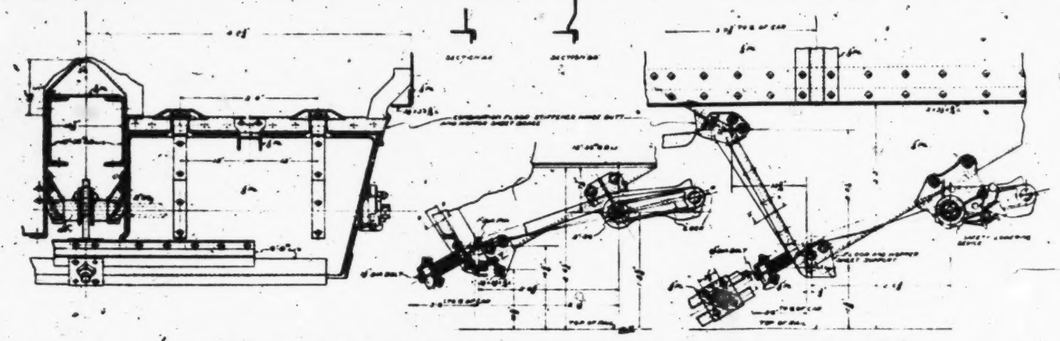


Fig. 120—Vertically Suspended Hopper Doors and Operating Mechanism, Type D

Enterprise Hopper Cars and Attachments (Cont'd.)

as shown on cross sections *A-A* and *B-B*, the possibility of leakage may be entirely overcome. The small floor and hopper sheet support casting at the bottom of hopper is also an effective member.

Drop doors of the twin type which are nearly horizontal when in their closed position are shown in Fig. 122. The door locking mechanism, located between the center sills of the car form locks for the doors of unquestioned integrity, there being two points of support, one for each door, that both may be securely locked instead of balanced as would be the case if there were one point of support only. Features of adjustment and convenience are incorporated with this mechanism as is also the Safety Door Lowering Device. The Combination Floor Stiffener, Hinge Butt and Hopper Brace Casting above referred to is likewise shown in this illustration.

Drop door latch equipment of the Ingoldsby type is also obtainable from this Company for use on hopper cars. It is not claimed, however, that latch equipment will satisfactorily take the place of a door operating mechanism. A serviceable lock is incorporated in such latches, but qualities of safety, convenience and adjustment are not comparable.

Ore Hopper Cars must be designed within unusual limitations due to the fact that most of the large ore docks around the Great Lakes provide only for the handling of short cars and to obtain a car of seventy tons capacity plus a ten percent overload, all available space must be utilized. As the material hauled is usually of a very sticky nature, it is necessary to provide steep inclined floors, preferably concave, and meeting the side walls of the car in a manner whereby pockets or other retarding influences are eliminated. Of equal importance is a large door opening so that bridging of material may be prevented and the quick discharge of the load assured. Such a door opening prevents the use of a continuous center sill construction which would be highly desirable and to obtain corresponding members such that the load will discharge freely from the car body.

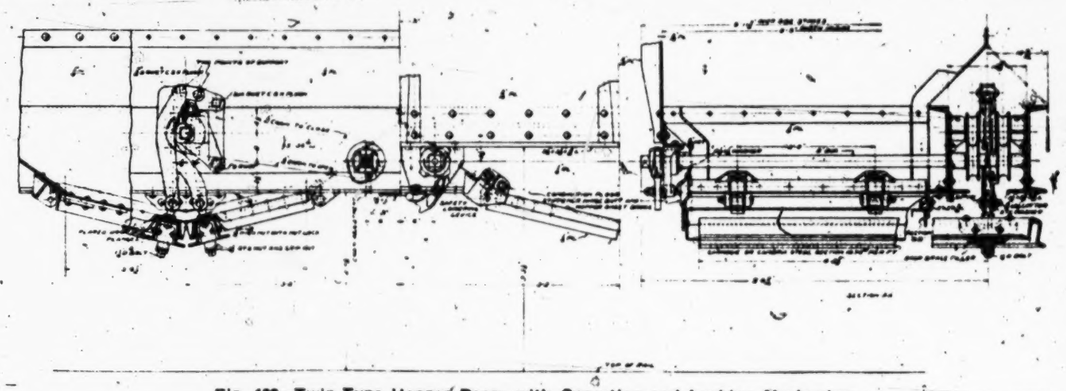


Fig. 122—Twin Type Hopper Doors with Operating and Locking Mechanism

In the designing of load discharging cars, the Enterprise Railway Equipment Company performs the service of Consulting Engineers for the purpose of better presenting its door-operating mechanisms, which are applicable to all standard designs of load-discharging cars and which the company supplies to the builders.

The door operating mechanisms of this company are in extensive use on nearly all of the large railway systems in the United States. [illegible]

This company believes that the light weight of a car should bear a proper ratio to the total weight of the car and the load to be carried; that the material used in the construction of the car be placed in such manner that the greatest cubic capacity will be obtained and that the arrangement of the doors should

the draft shocks are thereby effectively transmitted through the draft sills to the sides of the car. The car doors are necessarily large and support very unusual loads; therefore, the car door locking mechanisms must be of great strength, positive in character and the power for operating them multiplied. On such cars, safety operating equipment must be provided on both sides so that the operator may conveniently and safely operate them from his position at either side of the track.

The Enterprise Railway Equipment Company designs all of the above mentioned types and in fact all load-discharging cars for handling coal, coke, ore, ballast and grain. It also furnishes the car builders with the door-operating mechanism castings for such cars. To design cars to meet the varied fixed conditions which exist in different localities and to have the designs one hundred per cent efficient for the service intended has been the purpose of this company as car designers. Whether the conditions warrant the use of a hopper, a gondola or a general service car, or whether it be desired that the load be discharged to the side, or to the center of the track, or just below the car does not matter. So long as the conditions to be met are understood the company is prepared to furnish a suitable design.

minds of railroad officers having such specifications to prepare. The Enterprise Railway Equipment Company, after spending many years in careful study and experimentation on the development of this type of car, with its door operating mechanisms, safety devices, etc., is prepared to submit designs, comparative data and such other information as desired to all users of such equipment.

There are three distinctive types of hopper cars which may be referred to as Side Discharge—Fig. 123, Center Discharge—Fig. 126, and Bottom Discharge—Fig. 127. The latter incorporates two types of doors, the vertically suspended door at the end section and the horizontal twin doors at the intermediate section. The cars illustrated are all of fifty-five tons capacity. Designs of similar seventy-ton cars of the same general types are available.

Fig. 121—Safety Door Lowering Device

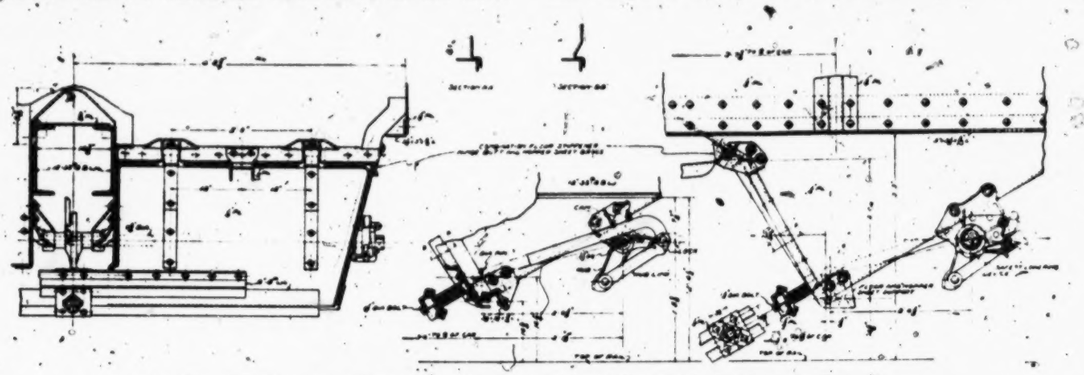


Fig. 119—Vertically Suspended Hopper Doors and Operating Mechanism, Type 'C

Equipment for hopper car doors of the vertically suspended type are shown in Figs. 119 and 120, representing two types of door operating mechanisms, known as type "C" and type "D," respectively; the detail parts of the two types differing considerably as regards the automatically locking parts, both of which form very positive locks when in a closed position.

In conjunction with these door opening mechanisms there is illustrated in both Figs. 119 and 120 a recommended adjunct product, the Combination Floor Stiffener, Hinge Butt and Hopper Sheet Brace Casting. This member combines in one piece the hopper floor stiffener and the hinge butts; also includes a brace at the end which prevents tearing of the hopper sheet. The casting also provides a seal along the top edge of the car door and as the hopper sheets are flanged along their sides to form a shield and abutment for the edges of the car door

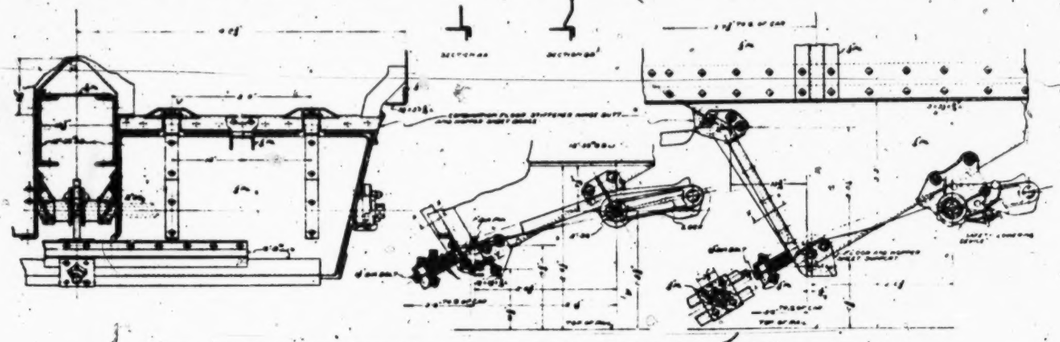


Fig. 120—Vertically Suspended Hopper Doors and Operating Mechanism, Type D

For other products and branch offices, see classified and alphabetical indexes.

ENTERPRISE RAILWAY EQUIPMENT CO., CHICAGO, ILL.

"C" and "D" mechanisms and it has been found is of great importance as a preventive of accidents and has made injury to the operator impossible.

casting at the bottom of hopper is also an effective member.

Drop doors of the twin type which are nearly horizontal when in their closed position are shown in Fig. 122. The door locking mechanism, located between the center sills of the car form locks for the doors of unquestioned integrity, there being two points of support, one for each door, that both may be securely locked instead of balanced as would be the case if there were one point of support only. Features of adjustment and convenience are incorporated with this mechanism as is also the Safety Door Lowering Device. The Combination Floor Stiffener, Hinge Butt and Hopper Brace Casting above referred to is likewise shown in this illustration.

Drop door latch equipment of the Ingoldsby type is also obtainable from this Company for use on hopper cars. It is not claimed, however, that latch equipment will satisfactorily take the place of a door operating mechanism. A serviceable lock is incorporated in such latches, but qualities of safety, convenience and adjustment are not comparable.

Ore Hopper Cars must be designed within unusual limitations due to the fact that most of the large ore docks around the Great Lakes provide only for the handling of short cars and to obtain a car of seventy tons capacity plus a ten percent overload, all available space must be utilized. As the material hauled is usually of a very sticky nature, it is necessary to provide steep inclined floors, preferably concave, and meeting the side walls of the car in a manner whereby pockets or other retarding influences are eliminated. Of equal importance is a large door opening so that bridging of material may be prevented and the quick discharge of the load assured. Such a door opening prevents the use of a continuous center sill construction which would be highly desirable and to obtain corresponding members of equal value for absorbing and transmitting the draft shocks the underframe of the car is boat-shaped, as illustrated in Fig. 144. It is claimed that

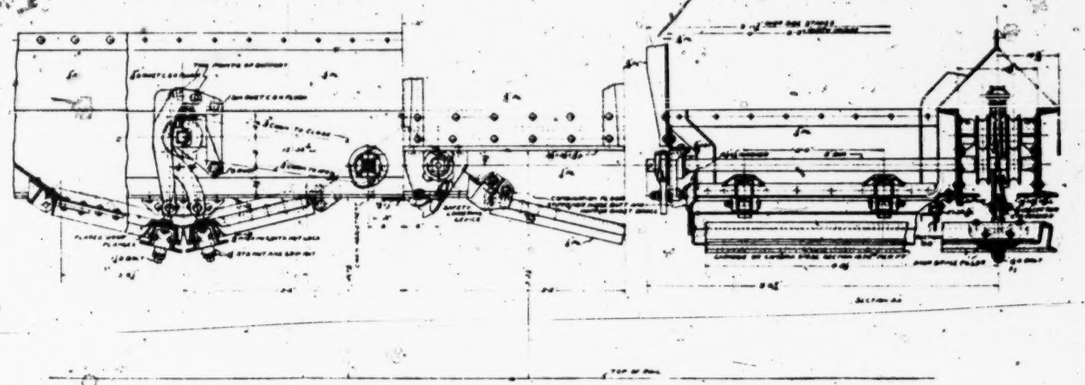


Fig. 122—Twin Type Hopper Doors with Operating and Locking Mechanism

be such that the load will discharge freely from the car body.

In the designing of load discharging cars, the Enterprise Railway Equipment Company performs the service of Consulting Engineers for the purpose of better presenting its door-operating mechanisms, which are applicable to all standard designs of load-discharging cars and which the company supplies to the builders.

The door operating mechanisms of this company are in extensive use on nearly all of the large railway systems in the United States. They combine the essential qualities of strength and simplicity with positive automatic lock adjusting features, also convenience and safety.

For other products and branch offices, see classified and alphabetical indexes.

ENTERPRISE RAILWAY EQUIPMENT CO., CHICAGO, ILL.

ENTERPRISE EXHIBIT No. 21

THE BALTIMORE AND OHIO RAILROAD COMPANY

Baltimore, Md., December 4th, 1922.

Door Operating Arrangement—

Mr. Argyle Campbell, President;
Enterprise Railway Equipment Co.,
"The Rookery", Chicago, Ill.

Dear Sir:—

I have your letter of the 27th ulto. on my return to the office, and I have noted your remarks and the blue prints of your standard door operating mechanism also the "Ingoldsby" latch for the same type of car.

We are now asking quotations on some hopper cars, and this question of door mechanism will probably be defined by the Chief of Motive Power at the time these cars are let, and then we will know what type of door mechanism he will decide to use.

There is a tendency to reduce cost and also the weight of equipment as much as possible, however, so far there has been no strong inclination towards the Hook door mechanism on this Road, and I believe after the present order is placed we will be able to determine more clearly which one of these mechanisms is in favor.

I thank you for the information and prints.

Yours very truly,

A. G. SANDMAN
Mechanical Engineer.

s-c

ENTERPRISE EXHIBIT No. 22

December
28th,
1922

Mr. E. W. Thornley, Assistant Purchasing Agent,
Baltimore & Ohio Railroad Company,
Baltimore, Maryland.

Dear Sir:—

I wish to thank you for your telegram of even date. It arrived shortly after noon and therefore just a little too late for me to reach Baltimore earlier than Friday night, which I thought perhaps might be inopportune; therefore my wire as follows:

> "Had I received telegram hour earlier would have been Baltimore Friday morning. In view of slight modification in market received yesterday and the large number of cars involved we feel that our price on type D mechanism should be modified. We would therefore propose to refund your Company one dollar and fifty cents per car difference our quotation to Builders also quotation your Company our letter November twenty first, also my letter December twentieth. In the latter letter please note paragraph four. If there are any matters for discussion or I could be of service in Baltimore would be glad to be there Tuesday morning. Confirmation of this wire follows."

As stated in the above telegram, we were advised yesterday of a slight modification in prices which would benefit us a very little, and as there are a large number of cars involved, we figured that a further downward revision was justifiable and therefore wish to revise our price to a net quotation to your Company of Twenty Three Dollars and Fifty Cents ($23.50) per car set, and having already quoted the Car Builders $25.00 per set and not desiring to change the price with any of them, I would propose the refund of $1.50 per car in the event that your Company would see fit to give us this business.

In my letter of December 20th to Mr. Galloway, I advised as follows:

> "We believe it to be the most perfect ever offered, as it combines convenience, safety and power at the side for operating, the most secure lock possible for holding the doors closed, means for holding them full wide open for unloading, adjustable means that tight fitting doors may be maintained, and strength of design to outlive the car body. Total weight including door braces 842#."

As I have also made quotation to your Company on our "Ingoldsby" Latch as illustrated on blueprint No. 3600 and our Bar Latch Device, drawing No. 3602, reduction could be made on these to Eleven Dollars and Fifty Cents ($11.50) per car and Fourteen Dollars and Twenty Five Cents ($14.25) per car respectively.

As advised in my wire, I will be glad to be in Baltimore Tuesday morning upon advice to do so, if there is any additional data desired or other matters for discussion.

Very truly yours,

President.

AC/ID

ENTERPRISE EXHIBIT No. 23

THIS AGREEMENT, Made this 15th day of November, A. D. 1919, between the PRESSED STEEL CAR COMPANY, a corporation, organized and existing under and by virtue of the laws of the State of New Jersey, hereinafter called the Licensor, party of the first part, and the ENTERPRISE RAILWAY EQUIPMENT COMPANY, a corporation, organized and existing under and by virtue of the laws of the State of Illinois, hereinafter called the Licensee, party of the second part, WITNESSETH: That,

WHEREAS, the Licensor is the exclusive owner of certain Letters Patent of the United States No. 865,920, for Improvements in Safety Clutch for Car Door Mechanisms, granted on the 10th day of September, 1907, upon the application of C. A. Lindstrom, and of all rights under said Letters Patent; and

WHEREAS, the Licensee has infringed the said Lindstrom patent No. 865,920, by making and selling Safety Clutch Mechanisms embodying the constructions shown and described in the Zimmer patent No. 1,059,422, issued to the Licensee on April 22, 1913;

NOW, THEREFORE, in consideration of One Dollar ($1.00), by each party to the other paid, and of other good and valuable considerations, and the covenants hereinafter contained, it is agreed as follows:

(1) The Licensor absolves the Licensee of all demands which it has, or may have, against it on account of the manufacture, sale or use by the Licensee of all devices embodying the inventions of the said Lindstrom patent manufactured or sold by the Licensee prior to the date hereof; and also absolves, for past infringements, those who have purchased any such devices from the Licensee.

(2) The Licensor hereby grants to the Licensee the license (not exclusive however) to manufacture and sell, or caused to be manufactured and sold, within the United States, subject to the conditions hereinafter named, Clutch Mechanisms or Safety Clutch Devicts embodying the inventions of the aforesaid Letters Patent No. 865,920 to the end of the term for which said patent No. 865,920 has been

granted, but the license hereby granted is limited to Clutch Mechanisms or Safety Clutch Devices of the type illustrated and described in the aforesaid Zimmer patent No. 1,059,422.

(3) The Licensee agrees to make complete and true returns to the party of the first part upon the 15th day of January, April, July and October in each year of all Clutch Mechanisms of the type illustrated and described in the above mentioned Zimmer patent, manufactured, sold or delivered by it, or caused to be manufactured, sold or delivered by it during the preceding quarter ending upon the first day of each of said months of the term hereof. And the Licensee hereby agrees to mark or cause to be marked each and all such Safety Clutch Devices manufactured, sold or delivered by it, or caused to be manufactured, sold or delivered by it, during the term hereof, with the word "Patented" and the day and year on which the said Lindstrom patent was granted, as aforesaid.

If in any quarter the Licensee shall not make, sell or deliver any such Clutch Mechanisms, a report to that effect shall nevertheless be made.

(4) The Licensee agrees to pay to the Licensor a royalty of ten cents (10c) per car as a licensee fee upon each and all of the said Clutch Mechanisms of the type illustrated and described in the above mentioned Zimmer patent manufactured, sold or delivered by it, or caused to be manufactured, sold or delivered by it from the 13th day of August, 1919, to the end of the term hereof. Ten cents (10c) per car shall mean that, irrespective of the number of such Clutch Mechanisms that may be applied to a single railroad car, the license fee shall be ten cents (10c) for the entire number designed to equip one car. It is further understood and agreed that if in any quarter period of the term hereof the licensee shall manufacture sell or deliver parts of said clutch mechanisms of the said Zimmer type for the purpose of reconstruction, reparation or replacement, then the licensee shall pay to the licensor the same royalty of ten cents per car, the number of cars which said parts will equip to be determined by fairly apportioning

said parts, as nearly as may be, into complete sets sufficient to equip cars of the types for which the licensee generally furnishes the said mechanism.

All of the said payments shall be made with each quarterly return provided for in the foregoing Clause "(3)".

(5) It is understood and agreed that the licensee hereby granted is personal to the Licensee, and is not assignable by the Licensee or by operation of Law, in whole or in part, except that the Licensee may have the said Safety Clutch Mechanisms illustrated and described in said Zimmer patent manufactured for it instead of manufacturing them itself.

IN WITNESS WHEREOF, the first party has executed this instrument by its Vice-President and Secretary, thereunto duly authorized, and the second party has executed the same by one of its Directors and Secretary, thereunto duly authorized, and both parties have affixed their respective seals the day and year first above written.

PRESSED STEEL CAR COMPANY
By J. F. MacENULTY,
Vice-President.

C. E. CHURCH
Secretary

ENTERPRISE RAILWAY-EQUIPMENT COMPANY
By GEORGE I. HAIGHT
Director.

N. M. GOLDSMITH
Secretary.

A. E. ZIMMER.

CAR DOOR OPERATING MECHANISM.

APPLICATION FILED APR. 27, 1912.

1,059,422.

Patented Apr. 22, 1913.

2 SHEETS—SHEET 1.

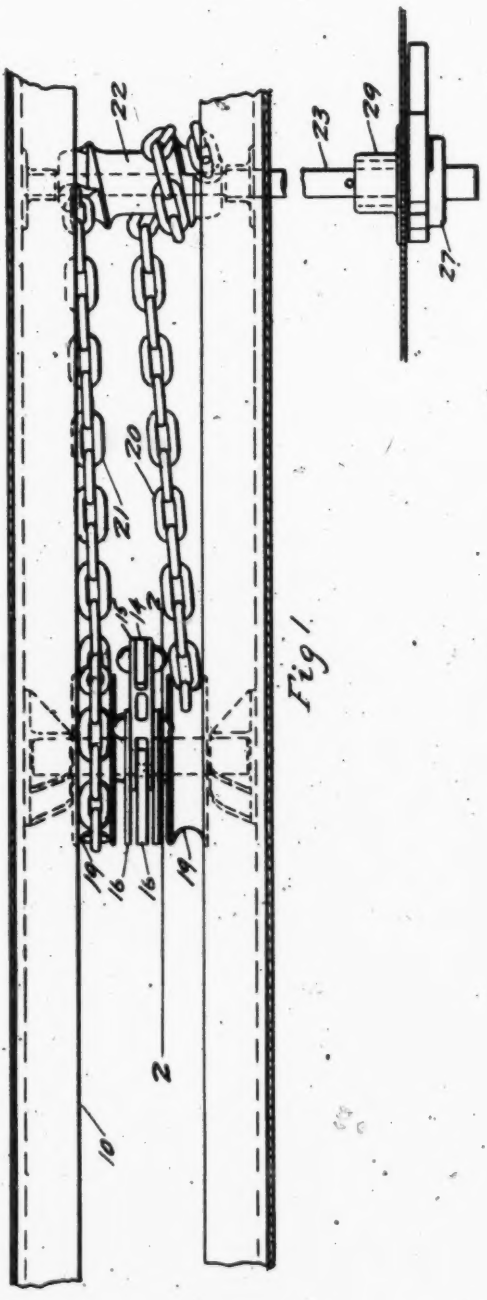


Fig 1.

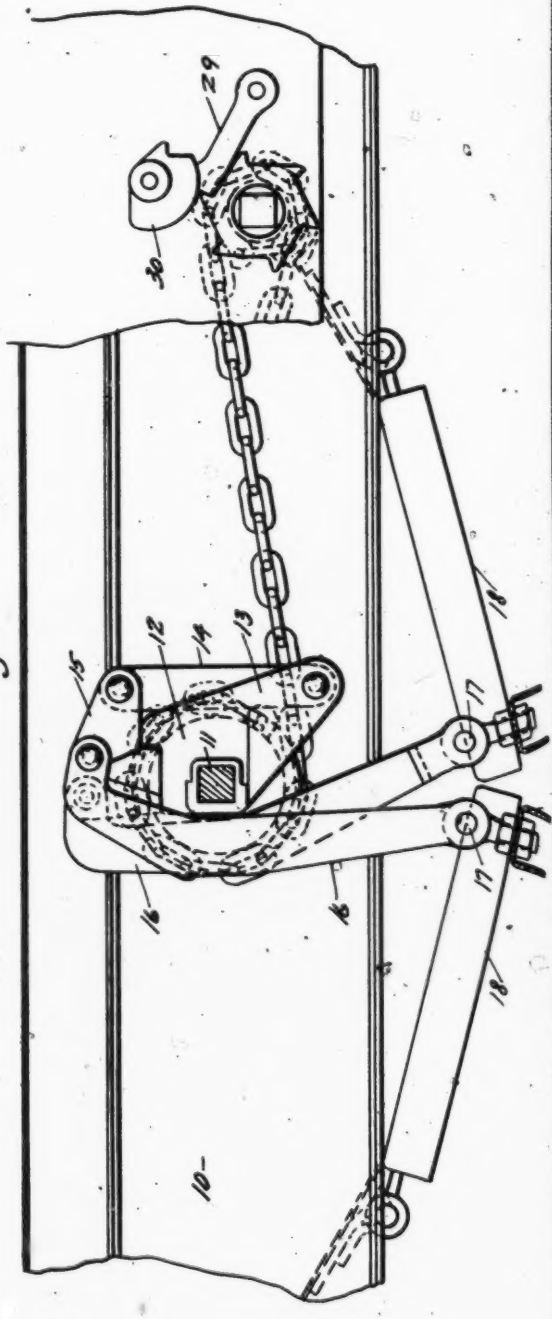


Fig 2.

WITNESSES:

Wm Geiger

A. W. Munday

INVENTOR.

Albert E. Zimmer

BY

Munday, Evarts, Adcock & Clarke.

ATTORNEYS

A. E. ZIMMER.

CAR DOOR OPERATING MECHANISM.

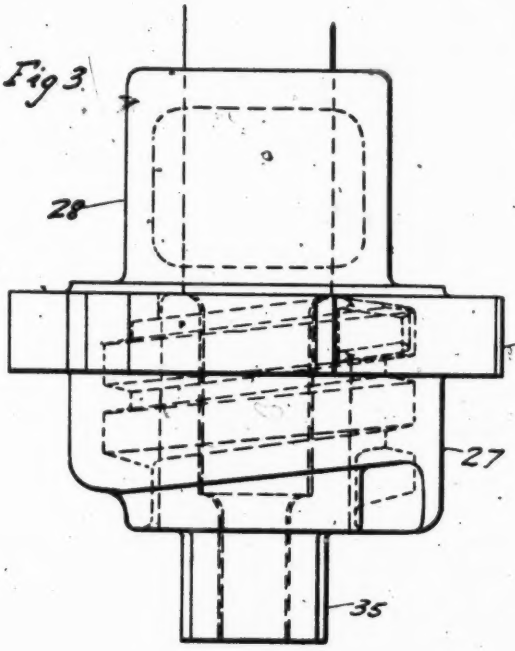
APPLICATION FILED APR. 27, 1912.

1,059,422.

Patented Apr. 22, 1913.

2 SHEETS—SHEET 2.

Fig. 3.



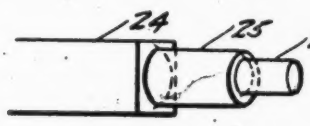


Fig. 7.

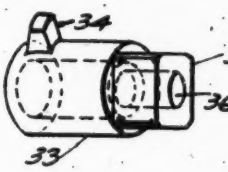


Fig. 8.

Fig. 6.

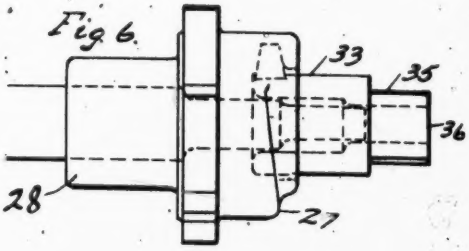


Fig. 4.

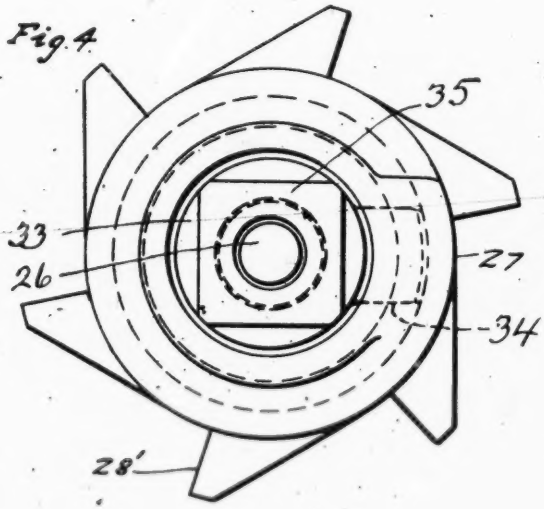
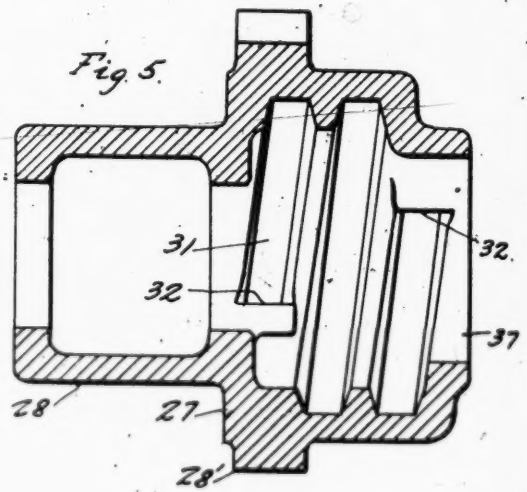


Fig. 5.



WITNESSES:

Wm Geiger

H. B. Munday

INVENTOR.

Albert E. Zimmer

BY

Munday, Evarts, Adcock & Clarke.

ATTORNEYS

UNITED STATES PATENT OFFICE.

ALBERT E. ZIMMER, OF CHICAGO, ILLINOIS, ASSIGNOR TO ENTERPRISE RAILWAY EQUIPMENT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CAR-DOOR-OPERATING MECHANISM.

1,059,422. Specification of Letters Patent. Patented Apr. 22, 1913.

Application filed April 27, 1912. Serial No. 693,756.

To all whom it may concern:

Be it known that I, ALBERT E. ZIMMER, a citizen of Norway, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Car-Door-Operating Mechanism, of which the following is a specification.

This invention relates to improvements in safety clutch car door operating mechanism.

The object of the invention is to provide means for unwinding the operating shaft of a car door mechanism, when unloading, with perfect safety to the operator.

Formerly, in car door mechanisms in many cases, it has not been customary to provide any sort of clutch mechanism between the operating shaft and the door, so that when the operating shaft is unwound, the load on the door tends to speed up the rotation of the operating shaft and thereby take with it the wrench or claw-bar used by the operator in starting the unwinding operation, and this often results in severe injury to the operator. In other cases, it has been customary to place a clutch or loose connection in the car door operating mechanism, but so far as I am aware, these clutches or loose connections are provided so as to allow less than a complete independent rotation between the member immediately operated upon by the wrench or claw-bar and the operating or winding shaft proper so that in cases where it is necessary to have a complete or more than a single rotation of the operating shaft in unwinding, it is found that the load will turn the operating shaft near the final open position of the car door and hence will twist the wrench or claw-bar from the hands of the operator and injure the latter.

The improvements which I have shown and herein describe are so arranged that the same may be adapted for operating shafts which require either less than a complete rotation or a plurality of rotations in unwinding and may be operated without injury to the operator.

My invention furthermore consists in the improvements in the parts and devices and in the novel combinations of parts and devices herein shown, described or claimed.

In the drawing forming a part of this specification, Figure 1 is a partial plan view of a car body underframe, showing my improvements in connection therewith, the parts being broken away to more clearly show the construction. Fig. 2 is a partial, vertical, sectional view, taken substantially on the line 2—2 of Fig. 1, and also showing in elevation a portion of the side of the car and the end of the operating shaft and immediate parts connected therewith. Fig. 3 is a plan view of the clutch operating mechanism proper. Fig. 4 is an end view of the structure shown in Fig. 3. Fig. 5 is a longitudinal, sectional view of one of the clutch members. Fig. 6 is a side elevation showing my improvements applied to the end of an actuating shaft, and Figs. 7 and 8 are detail, perspective views of the end of the actuating shaft and one of the clutch members, respectively.

In the drawings, 10, 10 denote the center sills of a dump car to which my improvements are adapted to be applied, and mounted on these center sills and extending laterally of the car is the operating shaft 11, the same being provided with a drum 12 having an extension 13 to which is pivoted a link 14, the latter having pivoted thereto at its opposite end a link 15, to which is pivotally secured hook shaped links 16, the latter being pivotally connected at their lower end to eye-bolts 17 secured in the free ends of hinged drop bottom doors 18. The mechanism which I have just described for lifting and closing the hinged doors may be of any suitable or well known form other than that which I have described, and it is immaterial to my invention what sort of winding connections are used. On each side of the winding drum 12 and keyed to the shaft 11 are chain winding drums 19, over which run winding and unwinding chains 20 and 21 between the actuating shaft being secured at their outer ends to a winding drum 22, keyed to a transversely arranged actuating shaft 23. Other means than that which I have described may be substituted for the winding and unwinding chains 20 and 21 betwen the actuating shaft 23 and the operating shaft 11, or in some instances, the operating shaft 11 may itself be extended to either the side of the car, or, when arranged longitudinally of the car. may have its ends extended to the ends of the car, and have the clutch device, about to be described, applied thereto, and thereby omitting the actuating shaft 23 entirely. The actuating shaft 23 is extended to the

side of the car, and as shown more clearly in Fig. 7, is provided with a square portion 24 and outer cylindrical portions 25 and 26, respectively, the latter being somewhat smaller in diameter than the portion 25.

Non-rotatably mounted on the squared portion 24 of the actuating shaft 23 is a hollow clutch member 27, the latter being formed with a bearing portion 28 adapted to be mounted in a journal bearing member 29 (see Fig. 1) secured to one of the car frame members. The clutch member 27 has preferably integrally formed therewith a ratchet 28′, of the usual construction, and with which coöperates a pivoted pawl or dog 29 adapted to be locked by the usual form of locking cam 30, as shown in Fig. 2. The interior of the hollow clutch member 27 is provided with a spiral groove 31, which may have one or more complete convolutions, always slightly in excess of and depending upon the number of rotations necessary to wind and unwind the operating shaft, said groove 31 being provided at each end thereof with a limiting stop 32. The second member of the clutch device, as more clearly shown in Fig. 8, comprises a hollow, cylindrical member 33, adapted to fit on the cylindrical portion 25 of the end of the actuating shaft, said member 33 being provided also with an integrally formed lug or projection 34 which moves in the spiral groove 31 and which limits the amount of rotation of the member 33 relatively to the member 27 when the same engages the limiting stops 32 at the ends of the groove 31. The outer end of the clutch member 33 is provided with a squared head 35, the latter being provided with a cylindrical bore 36 adapted to fit the reduced cylindrical end 26 of the actuating shaft 23. The squared end or head 35 is adapted to receive and be rotated by a wrench, claw-bar or other suitable device for winding and unwinding the operating shaft.

In assembling the mechanism, the clutch member 33 has its lug 34 first inserted through the circular opening 37 at the outer end of the other clutch member 27, and the member 33 with the lug 34 moving in the groove 31 is then rotated until the member 33 is within the member 27. Thereupon, the shaft 23 has its cylindrical ends 25 and 26 and the squared portion 24 inserted through the member 27 and member 33, and as will be obvious, these members are self locked in position. By forming the ratchet wheel integral with one of the clutch members, it will be seen that the entire device is exceedingly compact and one which can be cheaply manufactured.

I have shown and described one form of my invention, but it will be apparent that many changes and variations may be made in the details of construction thereof without departing from the spirit of the invention, and all such changes and modifications are contemplated as fall within the scope of the appended claims.

I claim:—

1. In a car door operating mechanism, in combination, a shaft and a clutch device connected therewith, said device comprising a member non-rotatably mounted on the shaft, and another member rotatably mounted and adapted to move longitudinally along the shaft, one of said members having a spiral groove, and the other a lug working in said groove, whereby the two members are rotatable independently of each other.

2. In a car door operating mechanism, in combination, a shaft and a clutch device connected therewith, said device comprising a member non-rotatably mounted on the shaft, and a second member rotatably mounted on the shaft and adapted to move longitudinally therealong, one of said members being provided with a spiral groove, the number of convolutions of which exceed the number of rotations required of the shaft in closing the car doors, and being provided with a limiting stop at each end thereof, and the other of said clutch members being provided with a lug working in said groove and limited in its rotations relative to the first named clutch member by said stops.

3. In a car door operating mechanism, in combination, a shaft and a clutch device connected therewith, said device comprising a member non-rotatably mounted on the shaft, said member having a spiral groove therein, and a second member rotatably mounted on the shaft and adapted to move longitudinally therealong, and provided with an integral lug coöperating with said spiral groove.

4. In a car door operating mechanism, in combination, a shaft and a clutch device connected therewith, said device comprising a hollow member non-rotatably mounted on the shaft and provided with a spiral groove on the interior thereof, said spiral groove being provided with limiting stops at each end thereof, and a second member rotatably mounted on the shaft and provided with an integral lug on the exterior thereof adapted to work in and coöperate with said spiral groove.

5. In a car door operating mechanism, in combination, a shaft and a clutch device connected therewith, said device comprising a member non-rotatably mounted on the shaft and having formed integrally therewith a ratchet wheel, and a second member rotatably mounted, one of said members being provided with a spiral groove and the other with a lug movable in said groove.

6. In a car door operating mechanism, in combination, a shaft and a clutch device connected therewith, said clutch device compris-

ing a member non-rotatably mounted on said shaft, a second member rotatable independently of said first named member and movable longitudinally relatively thereto, one of said members being provided with a spiral groove, and having limiting stops at each end thereof, and the other member being provided with a lug working in said groove and having a head adapted to receive a claw bar and be rotated thereby, one of said members having formed integrally therewith a bearing hub and a ratchet wheel.

7. In a car door operating mechanism, in combination, a shaft having a squared portion and a clutch device connected therewith, said clutch device comprising a hollow member secured to said shaft on the squared portion, and being provided also with a spiral groove on its interior, said spiral groove having stops at each end thereof, and said member being furthermore provided with an integrally formed ratchet wheel, and a second clutch member adapted to fit within the first named clutch member and rotatable relatively thereto, and having also a lug formed integrally therewith, said lug being adapted to move in the spiral groove, said second named clutch member having a squared end by which the same may be rotated by a wrench or other suitable means.

8. In combination, hinged car doors, an operating shaft and connections between said shaft and the free ends of the car doors, an actuating shaft and connections between said operating shaft and the actuating shaft, a clutch device on the actuating shaft comprising a hollow member non-rotatably mounted on the shaft and provided with a spiral groove on the interior thereof, and having also formed integrally therewith a ratchet wheel, and a second clutch member rotatably mounted on the shaft having formed integrally therewith a lug adapted to move in the spiral groove, said second named clutch member being provided also with a squared end by which the latter may be rotated and a pivoted pawl and pawl locking member coöperating with the ratchet wheel.

9. In a car door operating mechanism, in combination, an actuating shaft, and a clutch device connected therewith, said clutch device comprising a hollow member having a ratchet wheel formed integrally therewith and non-rotatably mounted on the shaft, and a second hollow member rotatably mounted within the first named hollow member and rotatable on the shaft, each of said members being mounted on the shaft and thereby self locked in assembled position.

ALBERT E. ZIMMER.

Witnesses:
PEARL ABRAMS,
H. M. MUNDAY.

Corrections In Letters Patent No. 1,059,422.

It is hereby certified that in Letters Patent No. 1,059,422, granted April 22, 1913, upon the application of Albert E. Zimmer, of Chicago, Illinois, for an improvement in "Car-Door-Operating Mechanism," errors appear in the printed specification requiring correction as follows: Page 1, line 95, strike out the words "between the actuating shaft" and insert the commas and words, *respectively, the latter;* same page, line 101, for the word "betwen" read *between;* page 3, line 6, strike out the word "and"; and that the said Letters Patent should be read with these corrections therein, that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of May, A. D., 1913.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.

No. 865,920. PATENTED SEPT. 10, 1907.

C. A. LINDSTRÖM.

SAFETY CLUTCH FOR CAR DOOR MECHANISMS.

APPLICATION FILED JUNE 15, 1906.

3 SHEETS—SHEET 1.

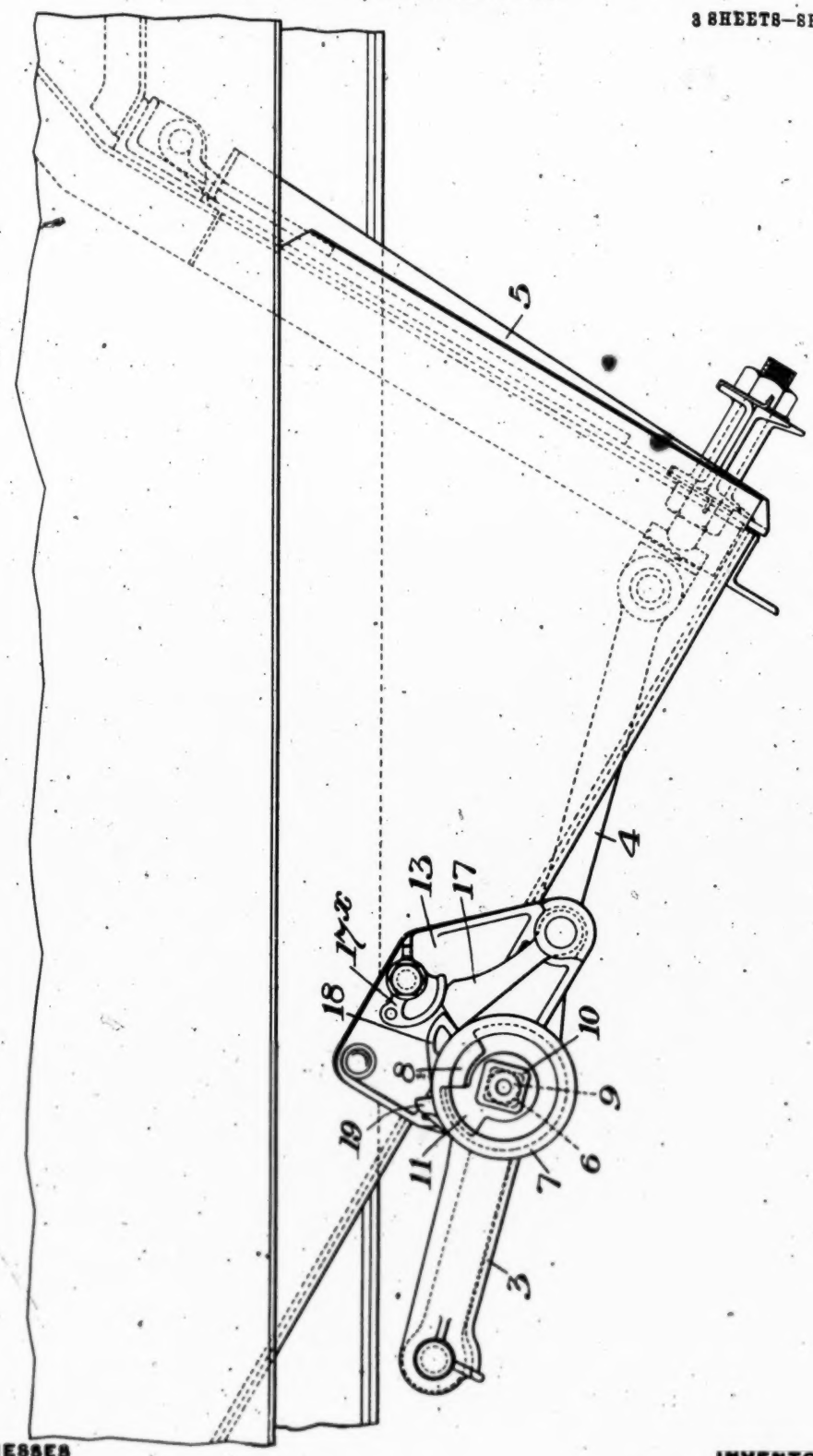


Fig. 1.

WITNESSES

Warren W. Swartz

R. A. Balderson

INVENTOR

C. A. Lindström.

by Bakewell & Byrne.

his Attys.

No. 865,920. PATENTED SEPT. 10, 1907.

C. A. LINDSTRÖM.

SAFETY CLUTCH FOR CAR DOOR MECHANISMS.

APPLICATION FILED JUNE 15, 1906.

3 SHEETS—SHEET 2.

Fig. 2.

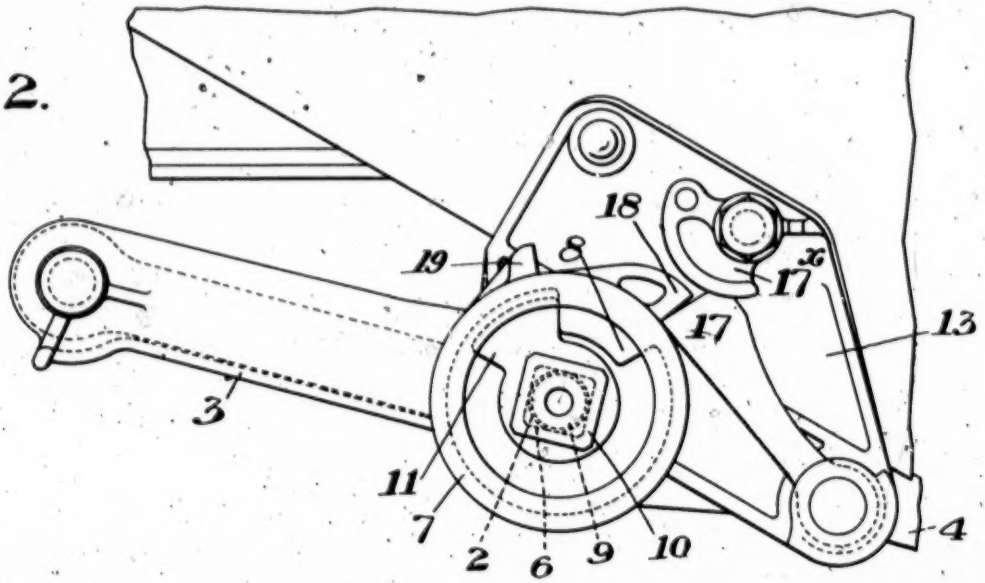


Fig. 3.

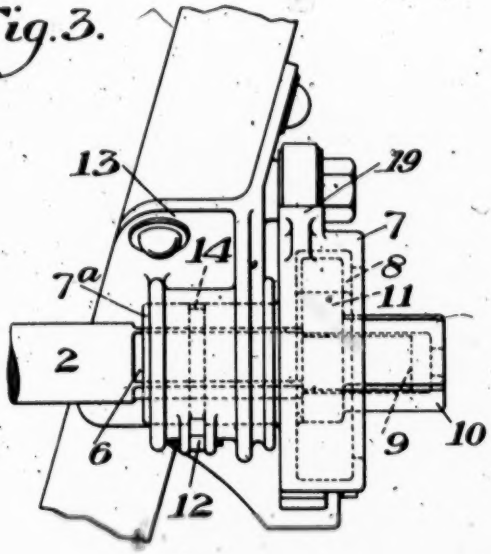


Fig. 4.

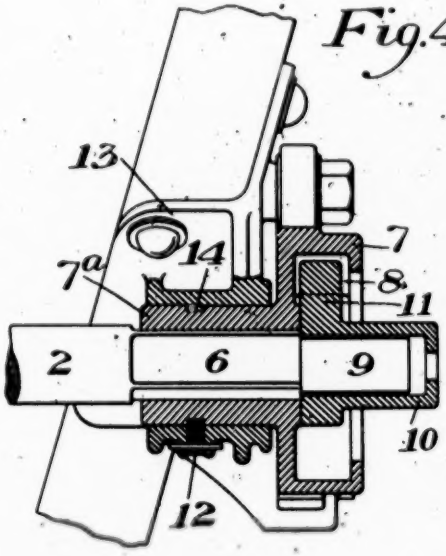
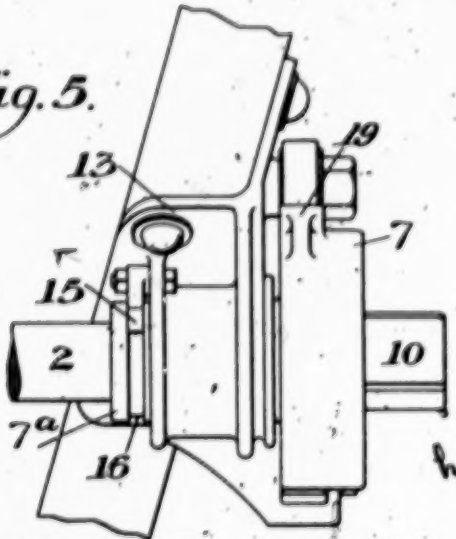


Fig. 5.



WITNESSES

Warren W. Swartz

R. A. Balderson

INVENTOR

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No. 865,920. PATENTED SEPT. 10, 1907.

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APPLICATION FILED JUNE 15, 1906.

3 SHEETS—SHEET 3.

Fig. 6.

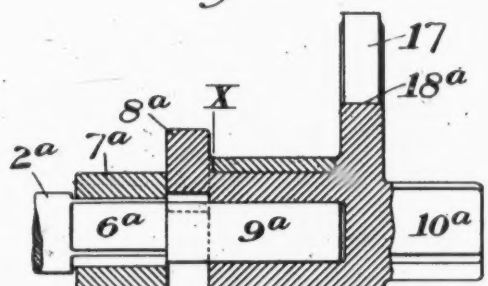


Fig. 7.

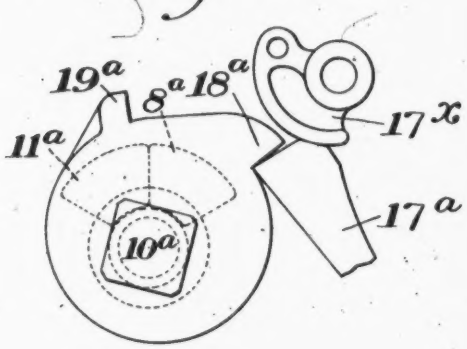


Fig. 9.

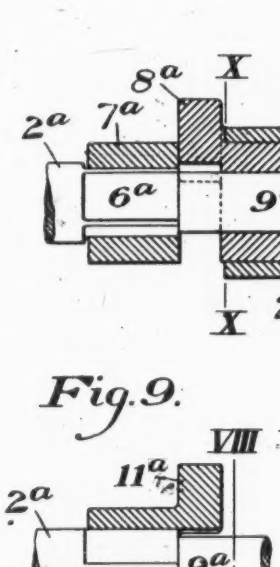


Fig. 8.

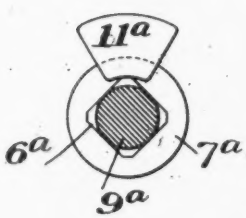


Fig. 10.

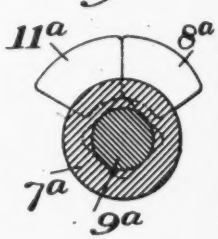


Fig. 13.

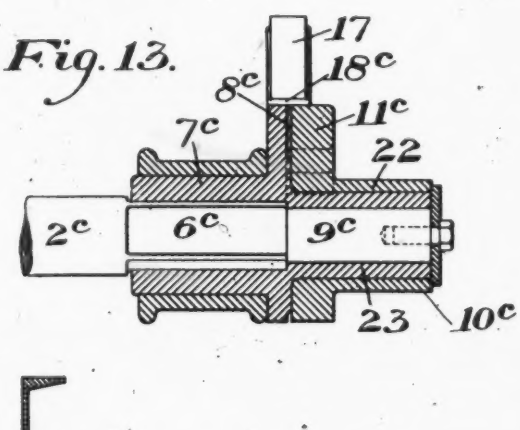


Fig. 14.

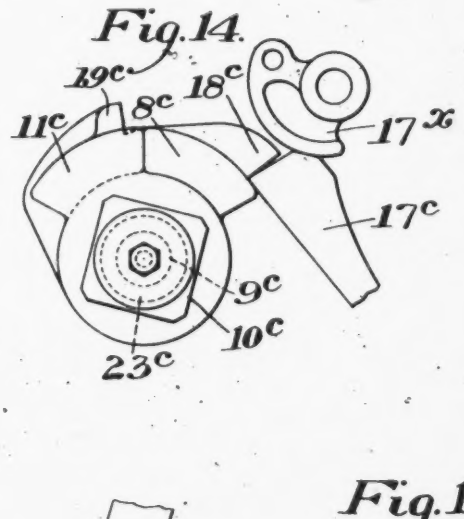


Fig. 11.

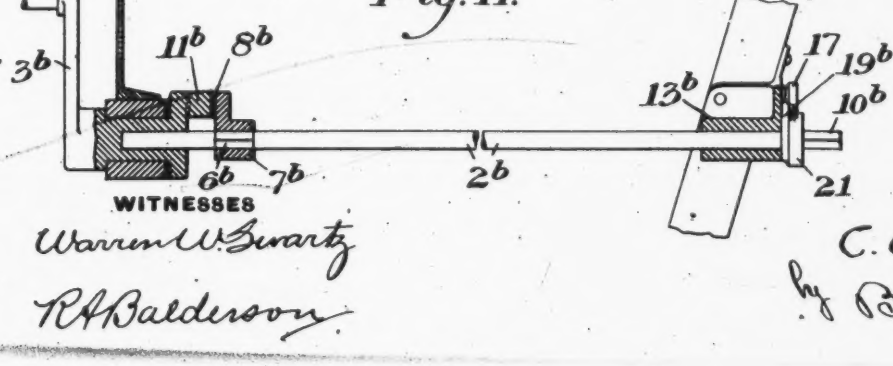
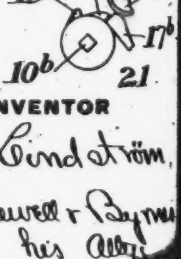


Fig. 12.



WITNESSES

Warren W. Swartz

R. A. Balderson

INVENTOR

C. A. Lindström,

by Babcock & Byrnes

his Attys.

UNITED STATES PATENT OFFICE.

CHARLES A. LINDSTRÖM, OF ALLEGHENY, PENNSYLVANIA.

SAFETY-CLUTCH FOR CAR-DOOR MECHANISMS.

No. 865,920. Specification of Letters Patent. Patented Sept. 10, 1907.

Application filed June 15, 1906. Serial No. 321,794.

To all whom it may concern:

Be it known that I, CHARLES A. LINDSTRÖM, of Allegheny, Allegheny county, Pennsylvania, have invented a new and useful Safety-Clutch for Car-Door Mechanisms, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of a portion of a hopper car showing my invention applied thereto; Fig. 2 is a side view on a larger scale showing part of the operating gear in connection with a device embodying my invention: Fig. 3 is an end view of the same; Fig. 4 is a sectional view of Fig. 3; Fig. 5 is a view similar to Fig. 3 but showing a minor modification; Figs. 6 to 10 are detail views showing modifications of the device as a whole; Figs. 11 and 12 show further modifications in the device as a whole; and Figs. 13 and 14 show minor modifications in my preferred construction.

My invention has relation to a safety device or clutch for use in connection with freight car drop door operating mechanism. Heretofore the door operating gears have usually been held in their closed position and been operated by shafts with ratchets or other devices all connecting together as a single unit, to release which device the operator placed a wrench on the square at the end of the shaft. As soon as the dog and the pawl or other locking device is released, the weight of the load on the doors acting back through the door-operating mechanism often causes the wrench to be thrown from the operator's hands before he has a chance to remove it from the square. This throw is often very violent, causing injury to the operator by striking him or by knocking him over the trestle or other supports upon which the car stands, and upon which he must stand in order to operate the doors.

The object of my invention is to provide an improved safety clutch connection between the door-operating shaft and the part to which the wrench is applied by the operator, such connection being so arranged as will permit the shaft to be released to open the doors, after which the shaft is free to move without effect upon the wrench, thereby obviating all danger of injury by reason of the wrench being thrown in the manner above described.

My invention is applicable to various forms of drop-door operating mechanism. In the accompanying drawing I have shown it applied in several different ways and its application in other forms will be apparent to those skilled in the art. In these drawings the numeral 2 designates the door-operating shaft connected in any suitable manner to the crank arm 3, having an operating rod connection 4 with the door 5. The shaft 2 has a squared or angular portion 6, upon which is a clutch 7 rotating with the shaft. In the form shown in my preferred constructions Figs. 1 to 5, this clutch has a sleeve portion 7^a, which is fitted over the squared portion of the shaft and a casing portion having an interior segmental lug 8. The end portion 9 of the shaft 2 is cylindrical, and has loosely seated thereon a clutch member composed of a wrench-seating portion 10, and a projecting arm or lug 11, the latter being within the casing portion of the clutch member 7 and arranged to coact with its lug 8 in the manner to be described.

The loose clutch member is prevented from falling out of the casing by the rim 7^b and the clutch member 7 is prevented from endwise movement in any suitable manner as by means of a key 12, seated in the bracket 13 and engaging the circumferential groove 14 in the exterior surface of the sleeve portion 7^a, as shown in Fig. 4, or by means of a pivoted latch 15 engaging a groove 16 in the projecting end portion of said sleeve, as shown in Fig. 5, or in any other suitable manner.

17 is the usual form of safety pawl, arranged to engage a lug or tooth 18 on the clutch member 7 to insure the locking of the door in closed position. This locking is, however, mainly effected by the crank 3 coming to and below the center line of the shaft 2 when the door is closed, as shown in Figs. 1 and 2.

17× is the usual safety dog which prevents the pawl 17 from working out of the tooth 18 when in the closed position. One or more additional teeth 19 may be used to assist in closing the door, and said teeth will permit the operator to change the position of the wrench on the square if desired.

To open the door, the parts being in the position shown in Figs. 1, 2, 6, 7 and 11, the dog 17× is knocked out. If then the pawl 17 cannot be lifted out of engagement with the tooth 18 by the hand by reason of the load resting on the pawl, due to crank arm 3 not having been placed over the center when the door was closed, the operator engages his wrench with the wrench-seating portion 10 and turns backwards, engaging the lug 8 with the opposite side of the lug 11 and continues to turn until the crank arm 3 is passed over the center, when, all load will be taken off of pawl 17 and it may be disengaged without the door opening up. The operator now turns to wrench-seating portion in the opposite direction until the lug 11 engages with the opposite side of lug 8 and continues to turn sufficiently to raise the crank arm 3 over the center line of the shaft 2. The load acting on the door now opens the latter and causes a partial revolution of the crank arm 3 and the shaft 2 without turning the wrench-seating portion 10, upon which the operator's wrench is seated, by reason of the engaging lug 8 moving away from the lug 11 without moving the clutch member. It will be apparent that no matter how quickly the load may act upon the door after it has been released, there will be no danger to the operator and he can remove his wrench at leisure.

In the modified construction as shown in Figs. 6, 7, 8, 9 and 10, the loose clutch member 20 is journaled in the bracket 13^a and the cylindrical portion 9^a of the

shaft 2^a is journaled in the said member; the lug 11^a is on the inside of the bracket 13^a and the wrench-seating portion 10^a and the teeth 18^a and 19^a are on the outside. The squared portion 6^a of the shaft 2^a with the clutch 7^a and its lug 8^a are also inside of bracket 13^a in a position suitable for engagement between the lugs 8^a and 11^a. The parts in these figures which correspond to similarly operating parts in the first described construction are given similar reference numerals, as will be seen, with the addition of the exponent *a*.

In the modification, Figs. 11 and 12, the shaft 2^b with the squared portion 6^b for the clutch member 7^b with the lug 8^b and the wrench-seating portion 10^b, as well as the portion 21 fixed to said shaft and containing the teeth 18^b and 19^b, form the loose member of the clutch; the lug 11^b being part of the crank arm 3^b in which the inner end of shaft 2^b is journaled.

In the modification, Figs. 13 and 14, the loose part 22 of the clutch containing wrench-seating portion 10^c and lug 11^c, is journaled on an extension 23 of the clutch 7^c, which carries the lug 8^c and the teeth 18^c and 19^c for the pawl 17^c.

Such modifications of my invention as are herein illustrated and described, but not specifically claimed, form the subject matter of divisional applications Serial Nos. 351,819 and 351,820, filed January 11th, 1907.

It will be obvious that my invention is susceptible to various modifications and hence I do not wish to limit myself to the particular form of device which I have shown and described.

What I claim is:—

1. In a door operating mechanism, a door-operating shaft, a bracket, a clutch member fast to said shaft and rotatably seated in said bracket, and a coöperating loose clutch member loosely connected to said shaft; substantially as described.

2. In a door-operating mechanism, a door operating shaft having an angular portion, a bracket, a clutch member secured to the shaft, and rotatably seated in the bracket, means for preventing endwise movement of the clutch member, and a coöperating cluth member loosely mounted on the end portion of the shaft; substantially as described.

3. In a car door operating mechanism, a door-operating shaft, a bracket, a clutch-member fixed to said shaft within the bracket, and formed into a casing portion having an internal clutch lug, and a plurality of external pawl teeth, a pawl for engagement with the said teeth, and a coöperating clutch-member loosely mounted on the shaft and having a clutch arm working within the casing portion of the fixed clutch member; substantially as described.

4. In car door operating mechanism, a door-operating shaft, a bracket, and coöperating fast and loose clutch members, one of which is rotatable in the said bracket; substantially as described.

5. In car door operating mechanism, a door-operating shaft, a bracket, a clutch member loosely connected to the shaft and journaled in the bracket, and a coöperating clutch member fixed to the shaft; substantially as described.

In testimony whereof, I have hereunto set my hand.

CHARLES A. LINDSTRÖM.

Witnesses:
K. L. ROBINSON,
GEO. H. PARMELEE.

ENTERPRISE EXHIBIT 26

Ingoldsby Patent 993,450

Issued to F. S. Ingoldsby, May 30, 1911

F. S. INGOLDSBY.

DUMP CAR.

APPLICATION FILED NOV. 26, 1907.

993,450.

Patented May 30, 1911.

5 SHEETS—SHEET 1.

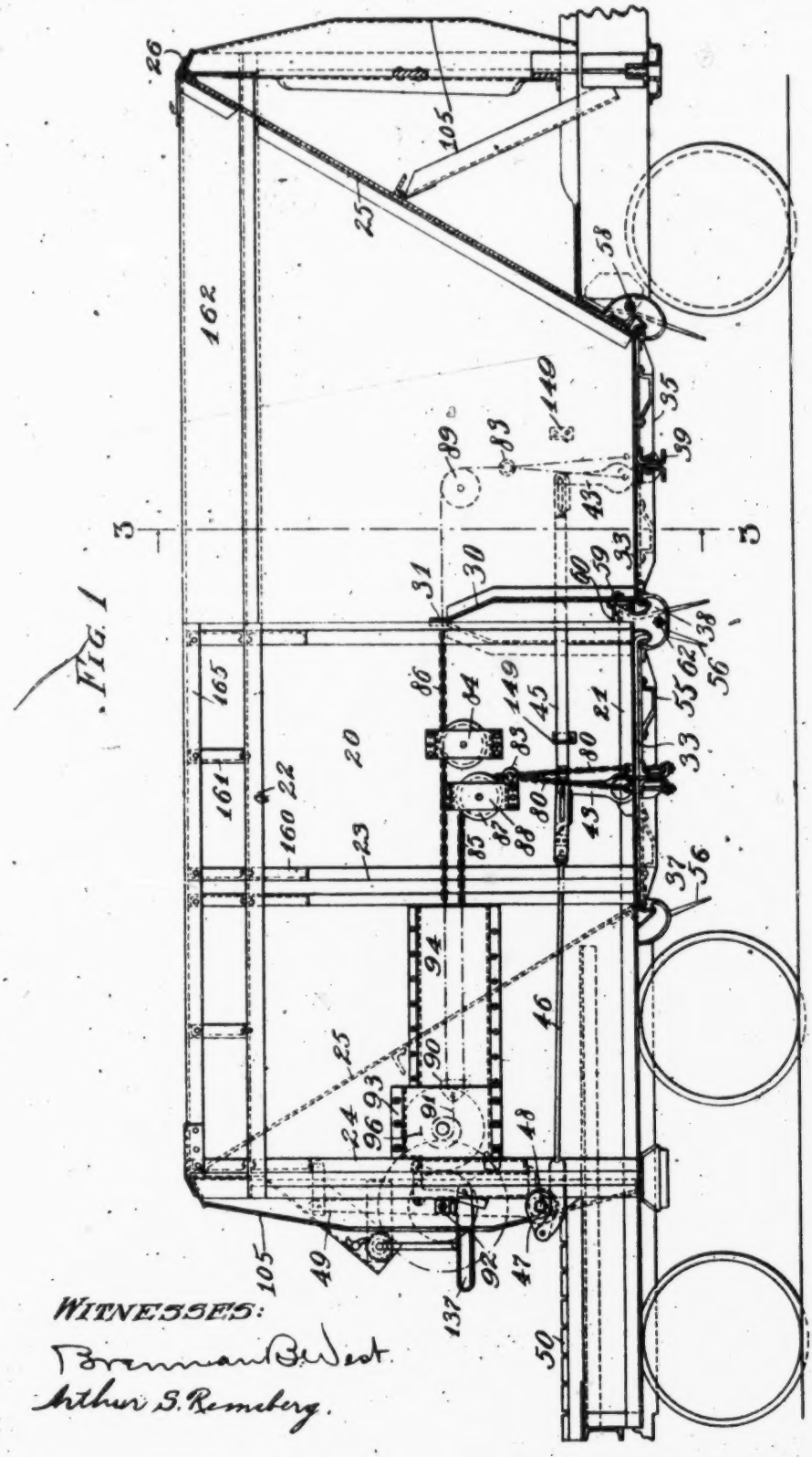


FIG. 1.

WITNESSES:

Brennan B. West.

Arthur S. Remeberg.

INVENTOR,

Frank S. Ingoldsby.

BY Baker, Foulds & Hall

ATTYS.

F. S. INGOLDSBY.

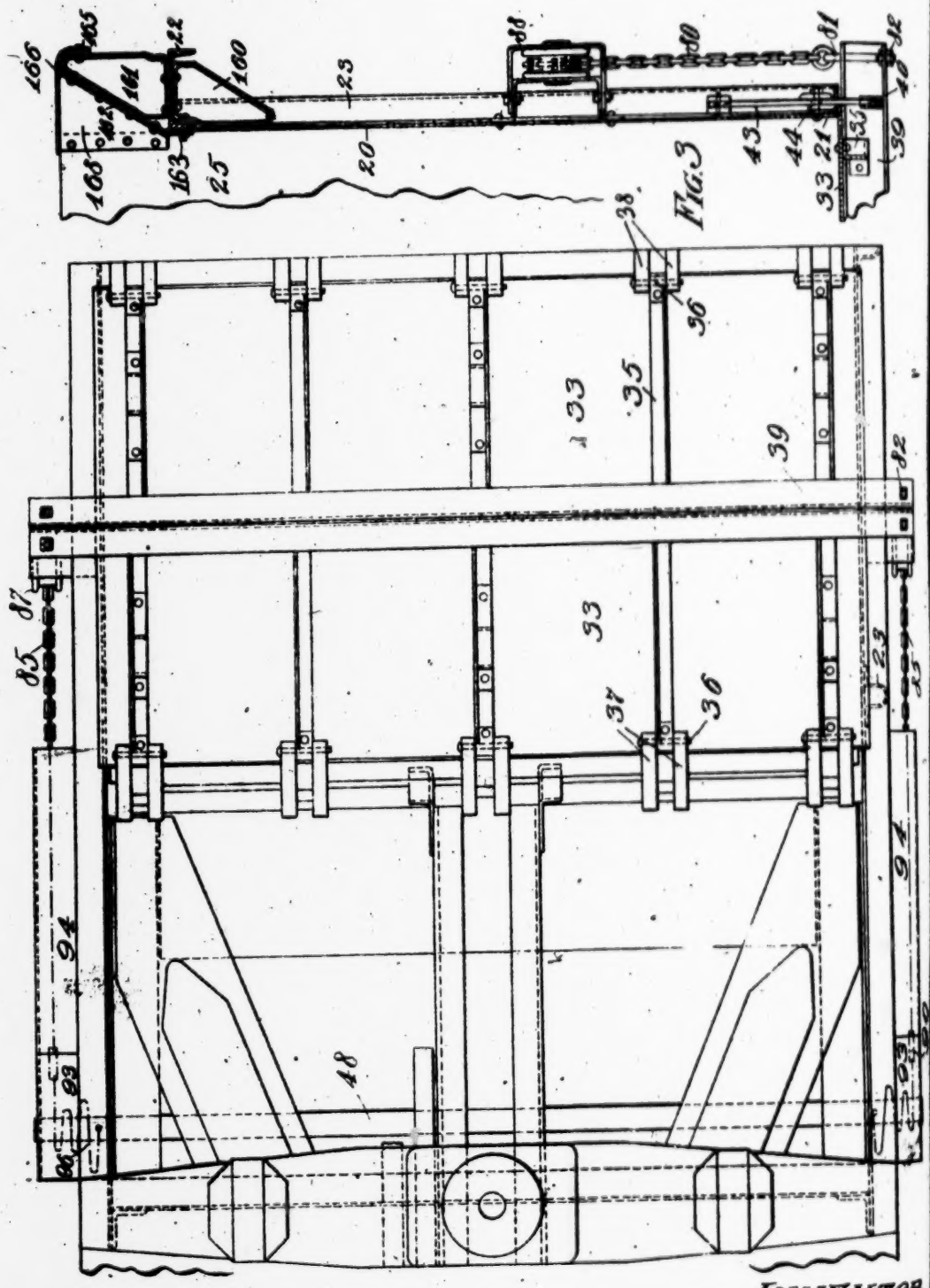
DUMP CAR.

APPLICATION FILED NOV. 26, 1907.

993,450.

Patented May 30, 1911.

5 SHEETS—SHEET 2.



WITNESSES:

Brennan B. West

Arthur S. Remsberg

INVENTOR,

Frank S. Ingoldsby.

BY Bakewell & Bakewell

ATTYS.

F. S. INGOLDSBY.

DUMP CAR.

APPLICATION FILED NOV. 26, 1907.

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Patented May 30, 1911.

5 SHEETS—SHEET 3.

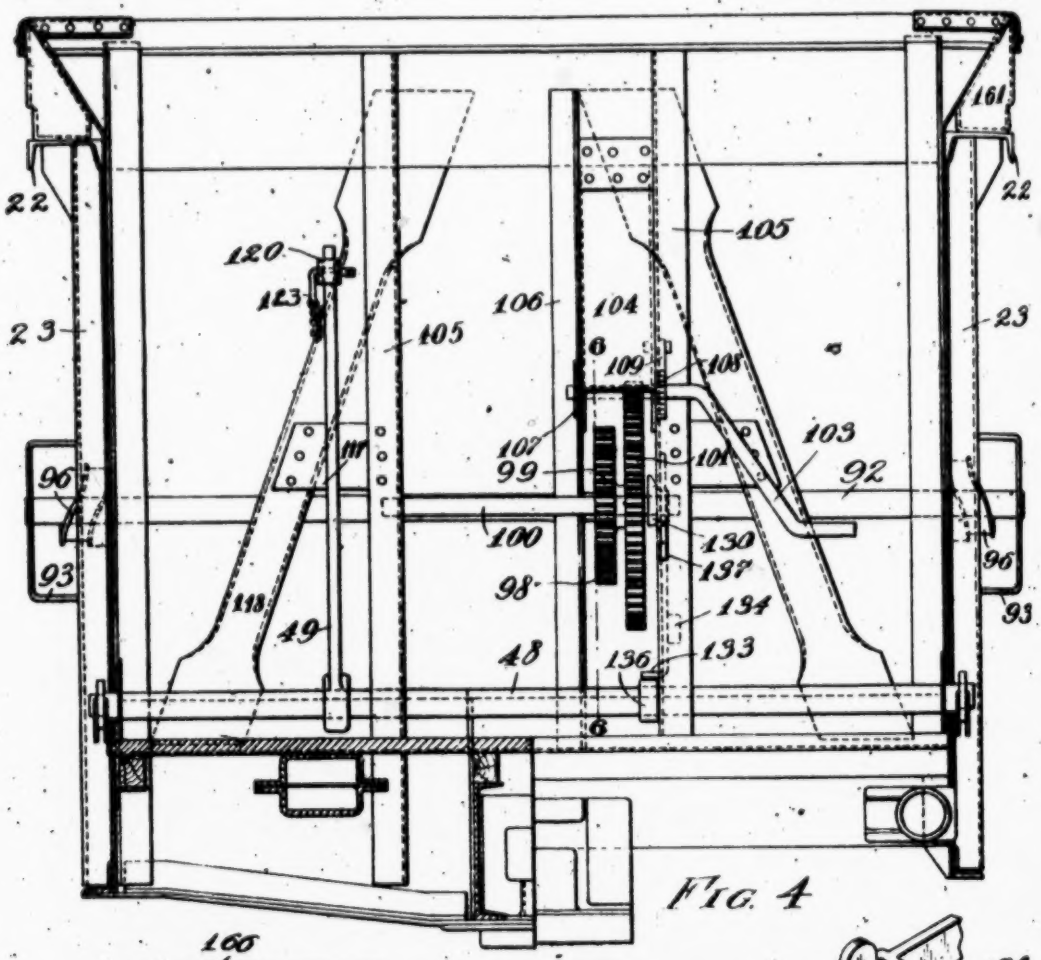


FIG. 4

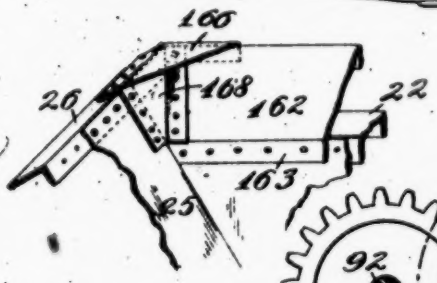


FIG. 5

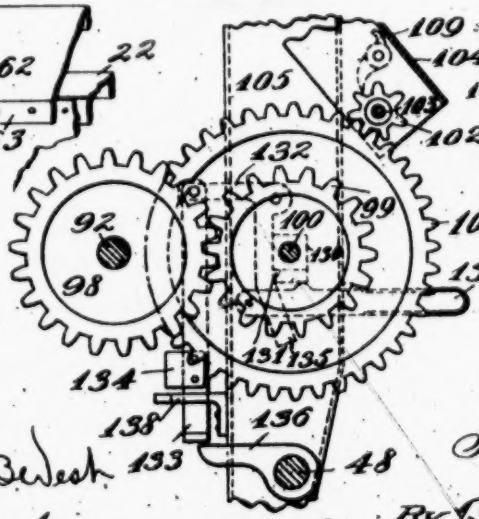


FIG. 6

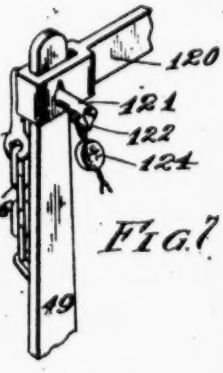


FIG. 7

WITNESSES:

Brennan B. West

Arthur S. Remberg.

INVENTOR

Frank S. Ingoldsby

BY Baker, Louis & Hill

ATTYS

F. S. INGOLDSBY.

DUMP CAR.

APPLICATION FILED NOV. 26, 1907.

993,450.

Patented May 30, 1911.

5 SHEETS—SHEET 1.

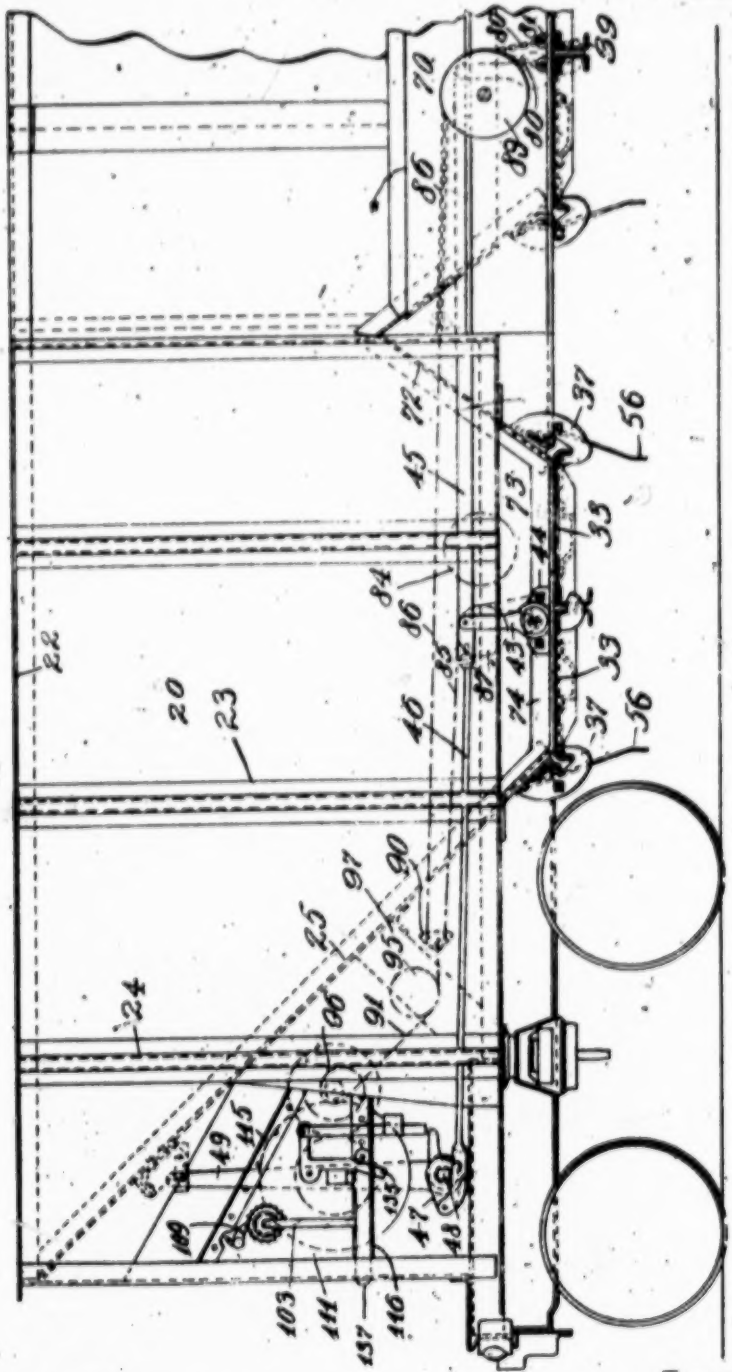


FIG. 8

WITNESSES:

Raymond B. West.

Arthur S. Remsberg.

INVENTOR.

Frank S. Ingoldsby.

By Baker, Poole & Hull

ATTYS.

F. S. INGOLDSBY.

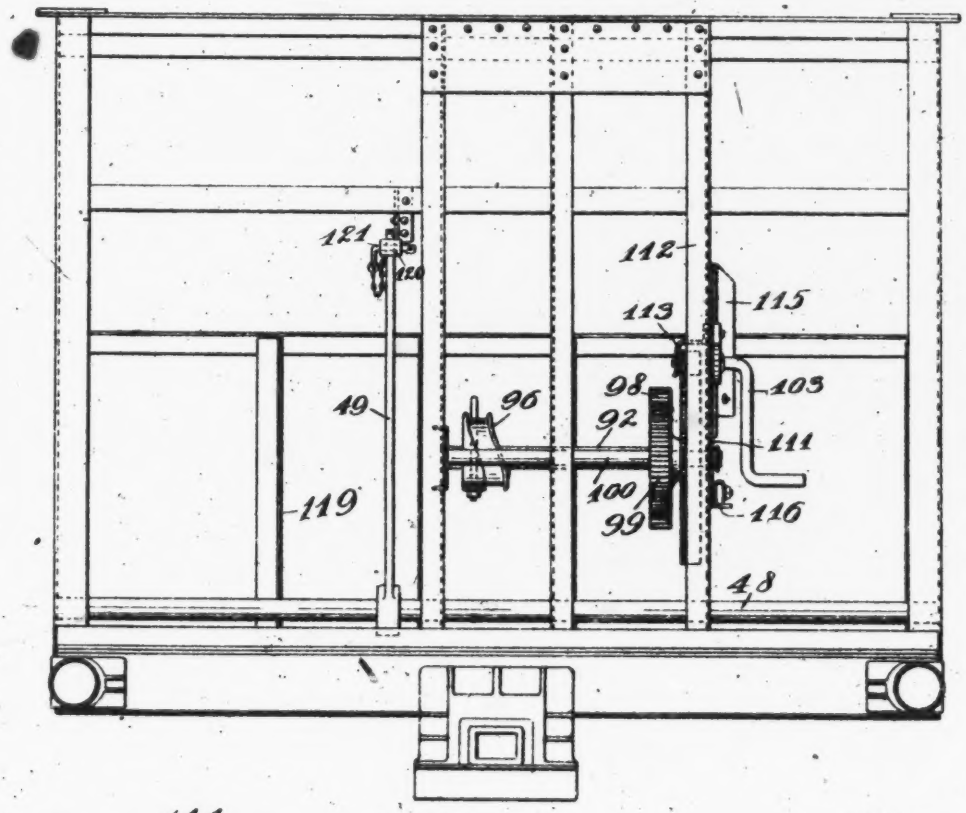
DUMP CAR.

APPLICATION FILED NOV. 26, 1907.

993,450. Patented May 30, 1911

5 SHEETS—SHEET 5.

FIG. 9



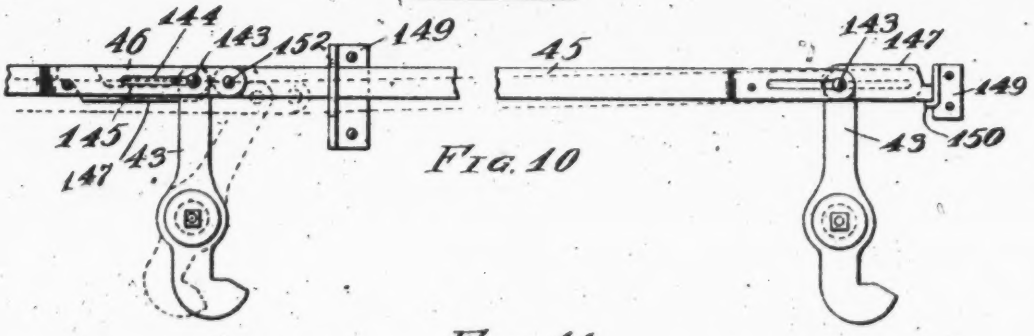


FIG. 10

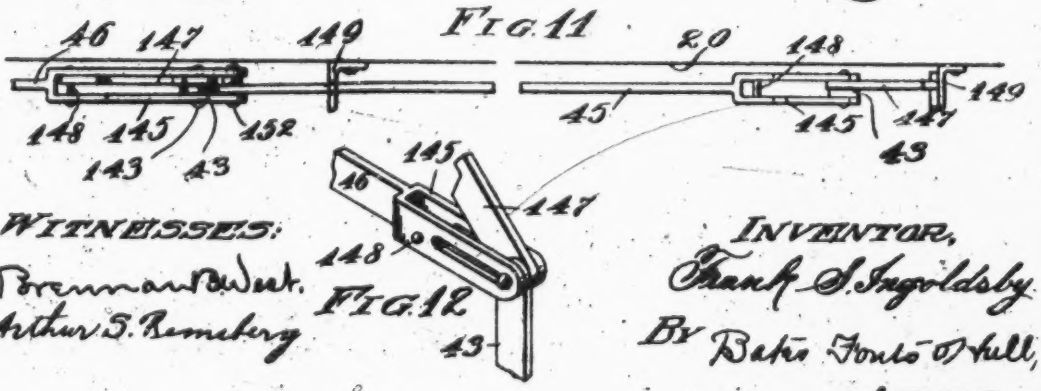


FIG. 11

FIG. 12

WITNESSES:

Brennan & Dewitt.

Arthur S. Remsberg

INVENTOR,

Frank S. Ingoldsby

BY Baker Foulds & Hull,

ATTYS.

UNITED STATES PATENT OFFICE.

FRANK S. INGOLDSBY, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE INGOLDSBY AUTOMATIC CAR COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF WEST VIRGINIA.

DUMP-CAR.

993,450. Specification of Letters Patent. Patented May 30, 1911.

Application filed November 26, 1907. Serial No. 403,919.

To all whom it may concern:

Be it known that I, FRANK S. INGOLDSBY, a citizen of the United States, residing at St. Louis and State of Missouri, have invented a certain new and useful Improvement in Dump-Cars, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The object of this invention is to provide an efficient dump car having transverse dumping doors.

In my car there is not only raising mechanism to return the dropped doors but independent locking mechanism to support the doors when raised. The movement of the locking mechanism to releasing position operates automatically to disengage the raising mechanism.

My invention is adapted for cars having a longitudinal center member dividing the car into hoppers each side of the center as well as to cars where such center member is omitted.

My invention provides efficient mechanism for raising the doors and for equalizing the raising force between two pairs of doors; it provides means whereby any of the doors may be released without others, or all the doors conjointly; it provides mechanism for disengaging the raising mechanism as the doors are being released and an efficient lock for the locking lever; it provides suitable springs carried by the car to receive the impact of the dropping doors; it provides for bracing the car at all points and for protecting the various portions of the raising mechanism; it provides a very efficient flare top for the car, increasing its carrying capacity and ease of loading and at the same time stiffening the upper chords; and it provides other features contributing to the efficiency of the car, as will be apparent from the following description.

The drawings illustrate my invention embodied in two forms of transverse dumping cars, one having a bottom substantially on the level of the side sills and having a transverse member dividing the car into two hoppers, and the other having a bottom depressed below the line of the side sills and having in addition to the transverse member a longitudinal center member, whereby the car is divided into four hoppers. It is to be understood, however, that the invention is not limited to these particular number of hoppers. In short cars it might be reduced to a single hopper and in an extra long car increased over that shown.

Figure 1 is a side elevation of a car having no longitudinal center member but a transverse member dividing the car into two hoppers; Fig. 2 is a bottom plan of a portion of such car; Fig. 3 is a vertical section through one of the sides of such car, as indicated by the line 3—3 of Fig. 1; Fig. 4 is an end view of such car; Fig. 5 is a perspective of one of the upper corners of the car looking from the interior of the car and illustrating the flare top; Fig. 6 is a sectional elevation of the winding gear, as indicated by the line 6—6 of Fig. 4; Fig. 7 is a perspective showing the lock for the upper end of the main operating lever; Fig. 8 is a side elevation of a portion of the car having a longitudinal center member; Fig. 9 is an end view of such car; Fig. 10 is a side elevation of a pair of locking levers and their operating link adapted to be carried on the car side; Fig. 11 is a plan of such mechanism; Fig. 12 is a perspective of the mechanism at the junction of the locking lever and operating link.

A number of the features of the present car are shown and claimed broadly in my prior application No. 397,200, filed Oct. 17th, 1907, the present invention being an improvement on the structure shown in such prior application.

As shown in the various drawings, 20 represents the plate girder side of the car, which is provided with a lower chord 21, upper chord 22, and vertical stiffeners 23. Leading upward from the bolsters are vertical main struts 24, 25 indicates sloping end floors which extend diagonally downward from cross beams 26 carried by the upper ends of the car.

In the form of the car shown in Figs. 1 to 4 inclusive, the raising chains are on the outer sides of the car and the car body terminates at the strut rising from the bolsters; while in the construction shown in Figs. 8 and 9 the chains are housed in a longitudinal center member leading from bolster to bolster, and the car body is shown as extending beyond the bolsters.

I will first describe the construction of Figs. 1 to 4. In this car, as shown, there is

a transverse center member 30 dividing the car into two hoppers. This center member consists of two plates a short distance apart and having sides parallel for some distance from their lower ends and near their upper ends bent inwardly toward each other, the extreme upper ends being riveted together as shown at 31. This beam is of sufficient depth to make a lateral brace for the car sides, and at the same time is so narrow that it uses little valuable space in the car body. 33 represents dumping doors which extend transversely of the car body and form the bottom of it between the lower ends of the inclined floors and the transverse member 30. These dumping doors have reinforcing floor beams 35 on their undersides which carry hinge eyes 36. Extending through these eyes are hinge pintles which extend into hinge castings 37 and 38 carried respectively by the underside of the inclined end floors and by the center member 30. These castings are recessed to allow the surface of the door to curve over the pintles so as to make a tight connection with the surface of the supporting member whatever the position of the doors. The doors are arranged in pairs, as shown. At their free coöperating edges they are provided with transverse channel beams 39 onto which the floor beams 35 are flanged and riveted. The channel beams 39 extend beyond the sides of the car as shown in Figs. 2 and 3, where their webs have holes 40 which are adapted to be occupied by the hooked ends of supporting levers 43 pivoted on bosses 44 secured to the sides of the car at suitable points. As shown, these bosses are mounted on the upward flange of the lower chord 21, thus making a very strong construction. The lower ends of the supporting levers 43 are hooked and beveled so that when they engage the channel beams they draw the doors tightly up against the lower edge of the car side. In this position, the channel beams 39, by reason of their webs engaging the outer surface of the levers, form ties across the car, preventing any outward bulging. A very tight joint is thus effected. The upper ends of the levers 43 are connected by links 45 and 46 with a rock arm 47 on a shaft 48 on which is a main operating lever 49. As shown in Fig. 1, this lever is placed intermediately of the car sides at the end of the body and stands vertical when the doors are locked. When it is swung down into a more or less nearly horizontal position above the end platform 50, the levers 43 are thereby rocked to release the doors, allowing them to drop. When the released doors swing downward, bumping-plates 55 on their lower sides engage bumper springs 56 carried by the car, these springs receiving the impact of the doors and preventing any injury to the raising chains. As shown, the springs are each located between two coöperating sections of the hinge castings. The intermediate springs are secured near their upper ends to the undersides of the inclined end floors and pass over and bear against filling block 58 separating the parts of the hinge casting 37. For this filling block I prefer to use a piece of pipe through which a bolt passes, this making it a tie as well. At the center of the car the springs may be secured at their upper ends by the same bolts 59 which secure the hinge castings 38, the springs lying between the inner faces of the webs and the tubular strut 60 surrounding the bolt. Beneath their upper ends these central springs lie on opposite sides of the strut-tie 62 and are adapted to bear against it.

The above description of doors, locking mechanism and bumper springs apply substantially also to the form of car shown in Figs. 8 and 9. There there is a longitudinal center member 70 extending from bolster to bolster. At the center of the car there extends between this member and the sides a transverse ridge 72. The surface of this ridge and the inclined end floors 25 are extended downwardly beneath the side sills, and the car sides have extension plates 73, thus increasing the size of the hoppers. The locking levers are journaled on castings 44 bolted to the lower reinforcing member 74 of these extension plates. The upper ends of the locking levers are connected by links 45 and 46 with the rock arm 47, rock shaft 48 and main locking lever 49, as already described. The construction of the doors 33 with the floor beams, etc., is the same as that already described, and the hinge castings 37 and the bumper springs 56 are the same as those above described for the outermost doors. In Figs. 8 and 9 the construction is the same for the innermost doors, the treatment of the lower edge of the transverse ridge 72 being substantially identical with that of the lower edge of the inclined end floors. In each type of car, the employment of the bumper springs, holding the doors away from the wheels allows an increased door opening and steeper end slope.

In Figs. 1 to 4, the raising chains are on the outer sides of the car, chains 80 lead upwardly from eyes 81 extending through the flanges of the channel beams 39 and adjustably secured by nuts 82. The upper ends of these chains meet in an eye 83. Leading upward from this eye is a single chain for the two doors of the pair. Where two pairs of doors are employed, as shown in Fig. 1, there are two of these common chains as indicated by 85 and 86. They pass over pulleys 87 and 89 secured in straps 88 riveted to the sides of the car and pass toward the end of the car where they are connected with a yoke 90. An extra pulley 84 is provided to receive and support the chain 86

when it is slackened. From the midpoint of the yoke 90 a common chain 91 leads to the winding shaft. It is to be understood that this mechanism is duplicated on the two sides of the car. The winding shaft 92 (as shown in Fig. 4) extends crosswise of the car from out to out beneath its inclined end floor and has its bearings in the side plates of the car. On the outer sides of such plates this shaft is provided with tapered helical or conchoidal drums 96, which act also as collars holding the shaft against lateral movement, and outside of these drums are journaled housings 93 bolted to the car sides. Within these housings the chains run onto the respective drums. When the doors have been dropped and the winding begins, the chains run onto the largest periphery of the drums, but as the doors approach the horizontal so that the larger portion of the weight comes onto the chains, the chains ride down onto a portion of the drums having shorter radius and finally onto the shaft 92 itself. The chain, as it winds onto the drum, moves outwardly thus effectively clearing the sides of the car and preventing any rubbing when the chain is under tension. Between the housings 93 and the first vertical stiffener 23, I provide a longitudinal casing 94 riveted to the car sides and extending over the chains. These casings 93 and 94 not only protect the chains but support them when they are slackened without the doors being released. The casing 93 is preferably bolted in place to allow its convenient removal.

In the form shown in Figs. 8 and 9 the course of the winding chains is similar, except but one set thereof is employed, at the center of the car. The chains 80 are secured to eyes 81 secured to the channel beams 39 at their centers. The chains 85 and 86 leading from these pass over the pulleys 87, 89 and 84 and are connected to an equalizing yoke 90, from which a common chain 91 leads beneath a guide sheave 95 (carried by diagonal plates 97 leading from the bolster to the inclined end floor), thence the chain 91 passes onto the spiral drum 96 located in the center plane of the car and mounted on the main winding shaft 92. The construction is thus similar to that described for the other type of car.

For rotating the shaft 92 in either form of car to raise the doors, I provide the following mechanism. Mounted on this shaft is a gear 98 meshing with a gear 99 on the shaft 100. Rigid with this gear 99 is a main gear 101 with which meshes a pinion 102 on the shaft of the crank 103. In the form shown in Figs. 4 and 6 the crank shaft 103 is mounted in the side plates of a diagonally projecting trough-shaped member 104 which also forms a roof over the gearing, preventing any lodgment of material thereon. This trough-shaped member lies on one side against the bulging end post 105 and on the other against the lighter vertical post 106. It is braced to the lighter post by the plate 107. The ratchet 108 is on the crank shaft on the outer side of the trough-like member 104 and the pawl 109 is pivoted to such member. The end posts 105 are preferably formed as shown in Fig. 1 to bulge intermediately in a longitudinal plane, thereby increasing their strength. The flanges of the end post give it strength transversely, and this transverse strength is materially increased by the gusset plate 117 which I rivet to one of these flanges and to the diagonal 118.

In the form shown, Figs. 8 and 9, the crank shaft 103 is mounted in a plate 111 which bridges from the main web plate stiffener angle 119 of the bolster to the end post 112 of the car, the extreme end of the crank shaft being journaled in a bracket 113 carried by this plate. Pawl 109 is also carried by the plate 111. This plate 111 is braced by suitable angle members 115 and 116.

In each form of construction the operation of raising the doors is substantially the same. The crank is rotated, rotating the main shaft 92 which winds in the chains to elevate the doors, and as the doors are brought home or nearly home (the pull being equalized onto the two pairs of doors by the yoke 90) the locking lever is thrown upward, causing the hooks 43 to engage the projecting channel beams of the doors and draw the doors snugly into place. It will be seen clearly from Fig. 10 that these hooks are beveled on their faces so that they may exert a considerable upward pull on the doors during this closing operation.

The closing operation is effected by raising the main operating lever 49 from approximately a horizontal position into a vertical position at the end of the car. In this position it may be securely held by a latch bar 120 pivotally carried by the car and having an eye or sleeve portion adapted to extend over the upper end of the lever, as shown in Fig. 7. When in this position, openings in the lever and sleeve aline and the locking pin 121 may be passed through these openings. This pin is preferably provided with a ward 122 which allows its passage only when the handle portion 123 is turned upward. After the passage, the weight of such handle portion swings the pin into position where the ward holds it against accidental displacement. A sealing wire 124 may be passed through this pin preventing its removal without breaking the seal, whereby tampering with the load without detection is avoided. A suitable chain 126 may hold the pin to the end of the car.

It is to be noticed that the main operating

lever 49, when it is in unlocked position, stands out over the end of the platform of the car, and is thus a visible and forceful reminder of the fact that it must be put back in place, thus insuring the locking of the doors after they have been raised by the winding mechanism.

When the lever is thrown downwardly to release the doors, it is desirable that the raising mechanism be disengaged to prevent the crank being violently thrown around and doing possible damage. I accomplish this by carrying the end of the shaft 100 adjacent to the gears in a movable box 130 which is normally supported on a catch 131 on a bell crank 132, from which leads downwardly a bar 133 carrying a weight 134, which insures said bar being always in proper position above the operating member 136. Projecting from the rock shaft 48 is a rock arm 136 which extends beneath the bar 133 and raises that bar whenever the lever is swung outwardly to release the doors. This raising movement of the bar swings the bell crank to release the box 130, whereupon that end of the shaft 100 and the gears carried by it drop downward a short distance, releasing the engagement between the gear 101 and the pinion 102. After the doors have dropped, the raising gear is brought back to initial position by means of the lever 137 which may be raised by hand to raise the box 130. When the lever 49 is returned to locked position after the doors have been elevated, the arm 136 engages the front side of the bar 133 and simply swings it rearwardly until it clears the bar, a sufficient space being provided for this in the guiding clip 138. The weight 134 brings the bar 133 back into place by gravity. The lower end of the bell crank 132 projects downwardly, as shown at 135, to furnish means by which this mechanism may be pushed backward independently of the operating lever. All one has to do is to push with his foot on the lower end of the arm 132 (as shown at 135) which is bent outwardly so that it is convenient for this operation.

It is frequently desirable to be able to dump either pair of doors independently of the other. Mechanism for this purpose is shown and broadly claimed in application No. 402,181, filed Nov. 14, 1907, by Joseph R. Bowling, such application showing means whereby each locking lever may be released from the operating link and locked in stationary position. In the present invention, I provide an improvement on the mechanism shown in Mr. Bowling's application. This is shown in Figs. 1, 10, 11 and 12, and consists of a suitable dog pivotally carried by the locking hook and serving to lock that hook to the link or to a stationary abutment. As shown, each hooked lever 43 is connected at its upper end with the corresponding operating link by means of a pin 143 passing through the upper end of the lever and occupying a slot 144 in the forked end 145 of the link, the lever occupying such forked end. When the main locking lever 49 is in closed position, the links are drawn to their extreme position at the left, as shown in Figs. 1 and 10, whereupon the end of the slot 144 engaging the pin 143 absolutely holds the lever in locked position. Pivoted on the same pin 143 is the dog 147, which is adapted to swing down into the fork 145 and rest on the pin 148 extending across that fork. In this position the dog forms a distance block locking the hook to the link, so that any movement of the link toward the right also moves the locking hook to release the doors, such position of the hook being shown in dotted lines in the left hand position of Fig. 10.

When it is desired to release the lever 43 from the link and still keep that lever locked, the dog 147 is simply swung through 180 degrees, causing it to abut the stop 149 riveted to the car side, the dog in this position resting upon a projecting lip 150 of this stop, or upon the pin 152, the dog being recessed on its upper side to allow this. In this new position the hook 43 is released from the operating link, but is locked against any movement to release the doors, the floor beams of the doors preventing any movement in the opposite direction. The link 45 is suitably connected with the link 46 as by being pivoted to a projection of the fork, as shown at 152. In its normal position the lower edge of the dog extends below the fork, whereby it may be conveniently dislodged by a blow on its under side. It will be seen that this dog provides an extremely simple mechanism for positively connecting the hooks with the links, or for releasing such hooks and independently locking them. When any hook is released and locked, the operating lever may throw the other hooks as usual. The mechanism is easily operated and has no loose parts which might get lost, and this dog 147 shows at a glance whether or not it is in the position desired. When the main lever 49 is in locked position, the doors are absolutely locked by the end of the slots 144 bearing on the pins 143, so that no operation of the dog could cause the opening of the doors, and thus the one seal 124, heretofore referred to, locks the entire car.

It is to be particularly noted that in each of the two types of cars illustrated, the parts of the winding mechanism, locking mechanism, doors, supporting hinges, and springs are identical. In the flexible connection the same chain and supporting pulleys can be used, the same eye-bolts, equalizing yoke and helical drum; and the drum shaft may be of the same diameter in the two types of cars,

being simply shorter in the car having the longitudinal center member. My mechanism is thereby of practically universal application for all types of cross-dumping cars. This universality and interchangeability of parts materially decreases the number of repair parts which are required to be kept on hand, where railroads, industrial concerns, or others, have cross-dumping cars of more than one type in their service; and this is also exceedingly valuable to the manufacturer or builder of cross-dumping cars, as it simplifies and cheapens the work of construction, and the purchase of supplies. It is to illustrate this important and valuable interchangeability that two types of cross-dumping cars are shown in this application.

I provide a flare top for the car, increasing its carrying capacity, making it easier to load, preventing the lodging or spilling of material, and stiffening the upper chord. This flare top is broadly claimed in my application referred to. I show it herein in an improved form, as follows: The upper chord of the car side is a channel beam 22 riveted to the side and projecting horizontally with its flanges downwardly. Beneath such channel I mount flanged bracket plates 160 which stiffen and support the outstanding web, these brackets being preferably on the webs of each stiffener 23 and 24. Above these bracket plates and secured to the web by the same rivets are similar flanged bracket plates 161 placed above each stiffener 23 and 24, and also between them. These upper plates have their outer edges substantially vertical and their inner edges inclining at a suitable angle. Mounted on the inner face of the brackets are plates 162 which constitute the diagonal walls of the flare top. These plates extend downwardly onto the inner side of the car at 163 and are riveted by the same rivets which secure the channel beam 22 and the bracket 160 in place. From this upper edge of the car side these plates 162 extend upwardly and outwardly, being riveted to the flange of the bracket 161. At the upper edge the plate 162 is curved over the bracket and extends downwardly onto the outer side a short distance, as shown at 165, and is there riveted to the outer flange of the bracket. The two brackets 160 and 161 may be of identical form for simplicity of manufacture.

At the corners of the car, I provide the triangular plate 166 extending over and riveted to the side of the flare top plate 162 and riveted also to the cross beam which supports the upper end of the inclined floor, this cross beam being shown as an angle member. At this corner I fill in the space between the sheet 162 and the inclined end floor by a plate 168 riveted thereto. The described construction of flare top is well braced, simple and effective.

It will be seen that my car has numerous advantages, among which may be mentioned very wide door openings and steep slopes, insuring free discharge of the load; door closing means which can be easily operated by one man to close the whole car; positive and certain locking of the cars when closed, so that they cannot be opened partially or wholly during transit without breaking the seal; simple and efficient mechanism enabling any of the doors to be released without the release of the others, as desired; an effective cross tie by reason of the locking levers and the floor beams; efficient disengagement of the raising mechanism when the doors are released, so that no one can be injured by the revolution of the crank handle; effective bumper springs to receive the impact of the doors when they drop, saving them and also the chains which raise the doors; an efficient flare top, increasing the carrying capacity, increasing the ease and economy of loading, preventing lodgment of material, and stiffening the upper chords; and various other features hereinbefore described.

Having thus described my invention, I claim:

1. In a dump car, the combination of a plurality of transversely extending dumping doors arranged in pairs, flexible raising members for the different doors, a single winding mechanism, and means for equalizing the pull for the different pairs of doors.

2. In a dump car, the combination of transversely extending doors arranged in pairs, two flexible raising members connected independently with two pairs of doors, a yoke to which the two raising members are connected, and a single winding member connected with said yoke.

3. In a dump car, the combination of transversely extending doors arranged in pairs, flexible raising members on each side of the car connected independently with two pairs of doors, two yokes to which the two members on the two sides are respectively connected, and flexible members connected with said yokes.

4. In a dump car, the combination of a plurality of transversely extending dumping doors arranged in pairs, raising chains for the different doors, a single winding mechanism, and an equalizing yoke between the same and said chains equalizing the pull for the different pairs of doors.

5. In a dump car, the combination of dumping doors, a winding shaft, flexible mechanism between the two, a driving pinion, gearing connecting the same with the winding shaft, and a counterweighted mechanism for holding the gearing in connection with the pinion but allowing it to be disengaged therefrom.

6. In a dump car, the combination of dumping doors, a winding shaft, flexible mechanism between the two, a driving pinion, gearing connecting the same with the winding shaft, a counterweighted mechanism for holding the gearing in connection with the pinion but allowing it to be disengaged therefrom, locking mechanism for the doors, and means for automatically throwing the disengaging mechanism when the locking mechanism is thrown.

7. In a dump car, the combination of dumping doors, a winding shaft, flexible mechanism between the two, a driving pinion, gearing connecting the same with the winding shaft, a counterweighted mechanism for holding the gearing in connection with the pinion but allowing it to be disengaged therefrom, and a lever for replacing the disengaged gearing.

8. In a dump car, the combination of dumping doors, a winding shaft, flexible mechanism between the two, a driving pinion, gearing connecting the same with the winding shaft, a counterweighted mechanism for holding the gearing in connection with the pinion, but allowing it to be disengaged therefrom, means for disengaging the gearing automatically when the doors are released, and means for disengaging the gearing independently of the door release.

9. In a dump car, the combination of door closing mechanism including a pinion and gear, a bell crank sustaining the gear in engaging position, a depending bar connected with the bell crank, a weight for holding the bell crank in engaging position, and means for raising the bar.

10. In a dump car, the combination of dumping doors, mechanism on the sides of the car for holding the doors closed, a rock shaft extending crosswise of the car, arms on the ends of the rock shaft connected with said locking mechanism on the two sides of the car, and a lever on the rock shaft between its ends.

11. The combination with dumping doors, locking hooks therefor on the sides of the car, a through rock shaft extending crosswise of the car near one end, arms on the end of said rock shaft, a lever for operating said rock shaft, and links connecting the arms with the hooks, said links passing to the arms on the under side of the axis of the rock shaft.

12. In a dump car, the combination of locking mechanism, a lever for operating it, a latch for the lever, said latch and lever being provided with openings adapted to aline, and a pin adapted to extend through such alined openings, said pin and openings having coöperating features preventing the removal of the pin in normal position.

13. In a dump car, the combination of dumping doors, hinges for carrying the same, and bumper springs carried by the car and depending between adjacent members of the hinges.

14. In a dump car, the combination of dumping doors, hinges for carrying the same, bumper springs carried by the car and depending between adjacent members of the hinges, and filling blocks carried by such members against which the spring bears below its point of securement.

15. In a dump car, the combination of a dumping door having a projecting floor beam, a hole through such beam, and a locking hook adapted to extend through such hole.

16. In a dump car, the combination of a dumping door having a projecting floor beam with a vertical web, a hole through such web, and a locking hook adapted to extend through such hole.

17. In a dump car, the combination of a transverse dumping door, a rolled beam having a vertical web secured to such door near its free edge, a hole through such web, and a locking lever pivoted on the car side and having a hooked lower end adapted to extend through such hole.

18. In a dump car, the combination with the car sides, ends, and bottom, of end posts bulging intermediately to present an extended web in the longitudinal direction of the car, dumping doors, and raising mechanism therefor mounted on one of such end posts.

19. The combination of a dumping car having flexible members on its sides, winding mechanism therefor, and readily removable casings on the outer sides of the car through which such members extend and which may support the members when slack.

20. In a car, the combination of longitudinally bulging end posts, diagonal posts and gussets connecting the same.

21. In a dump car, the combination of a locking lever, a link for operating it, and a dog pivoted to the lever and serving to lock it to the link or to a stationary abutment.

22. In a dump car, the combination of a locking lever, a slotted link, a pin carried by the lever and extending through such slot, and a dog pivoted to the lever and adapted to block the movement of the lever in the direction allowed by the slot.

23. In a dump car, the combination of a locking lever, a slotted link, a pin carried by the lever and extending through such slot and a dog pivoted on such pin and adapted to block the movement of the lever in the direction allowed by the slot.

24. In a dump car, the combination of a locking lever, a forked and slotted link embracing it, a pin occuping the lever and slot, and a dog mounted on said pin and serving to lock it in the fork of the link or to a stationary abutment.

25. In a dump car, the combination of a locking lever, an operating link, a pin on the lever occupying a slot in the link, a dog pivoted on such pin, a stationary abutment, the dog being adapted to occupy one position locking the lever to the link and another position locking the lever to the abutment.

26. The combination with a car having an upper chord with a laterally projecting portion, of a bracket above such portion, and an inclined plate secured to said bracket and providing a flare top.

27. The combination of a car side, an upper chord, similar brackets above and below it, and a plate carried by the upper bracket.

28. The combination with a car having an upper chord with a laterally projecting portion, of a bracket above such portion, an inclined plate secured to said bracket, and a bracket below the chord.

29. The combination with a car having vertical stiffeners on its sides and upper chords with laterally projecting portions, of brackets above such portion, an inclined plate secured to said brackets, and brackets below the chord and bearing against the vertical stiffeners on the car side.

30. In a dump car, the combination of an inclined end floor extending over the truck, a dumping door hinged at the lower end of the end floor and adapted to swing downwardly toward the truck, and means adapted to engage the under side of the door and limit its swing, whereby the size of the door opening may be increased and the said door when dropped not interfere with the wheels.

31. The combination of a shedding surface, a dumping door hinged thereto, and a bumper spring carried by such surface.

32. In a dump car, the combination of an inclined end floor, a transverse door, hinges for the door secured to the under side of the end floor, and a bumper spring for the door secured to and depending from the under side of the end floor.

33. In a dump car, the combination of door raising mechanism, locking mechanism for the doors when raised, a lever for operating the locking mechanism, an arm movable with said lever, and mechanism for disengaging the raising mechanism, including a member hanging by gravity over said arm.

34. In a dump car, the combination of door raising mechanism, including a pair of meshing gears, means for releasing one of said gears and allowing it to drop by gravity out of mesh, and a lever adapted to be moved to return such dropped gear, said lever being so pivoted as not to be moved when the gear drops.

35. In a dump car, the combination with dumping doors, of flexible raising mechanism on the sides of the car, a shaft extending crosswise of the car, drums on said shaft near its ends acting as collars to prevent the lateral displacement of the shaft, the flexible raising mechanism winding onto said drums.

36. In a dump car, the combination of door raising mechanism, a crank rotating in a plane longitudinal of the car to operate the raising mechanism, and means for disengaging the raising mechanism at a point between the crank and the door.

37. In a dump car, the combination of door raising mechanism, a crank rotating in a plane longitudinal of the car to operate the raising mechanism, means for disengaging the raising mechanism at a point between the crank and the door, means for supporting the doors when raised, and means for automatically causing the said disengagement preceding the release of the doors.

38. In a dumping car, the combination of end posts bulging intermediate their ends to present an extended web in the longitudinal direction of the car, a shaft journaled in said web and means for operating the said shaft.

39. In a dumping car, the combination of end posts bulging intermediate their ends to present an extended web in the longitudinal direction of the car, a shaft journaled in said webs, and a winding mechanism operated by said shaft.

40. The combination of a girder side having stiffeners, locking mechanism extending through the stiffeners and raising mechanism extending outside the stiffeners.

41. The combination with a car side having vertical stiffeners, pivoted locking hooks supported by the side, an operating link connecting with said hooks and extending through openings in the stiffeners, pulleys carried by the car sides, and flexible raising mechanism passing over the pulleys outside of the stiffeners.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

FRANK S. INGOLDSBY.

Witnesses:
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CAR DOOR OPERATING MECHANISM

Original Filed August 26, 1921

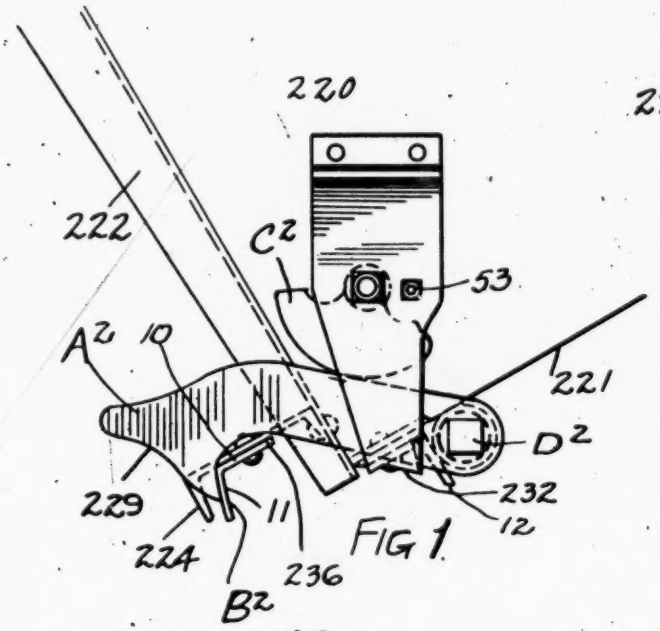

FIG 1

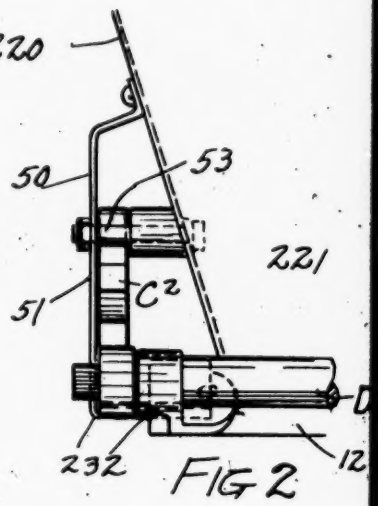

FIG 2

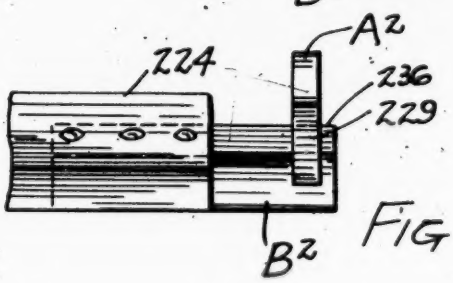

FIG 3

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THEIR ATTORNEY

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UNITED STATES PATENT OFFICE.

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CAR-DOOR-OPERATING MECHANISM.

Original application filed August 26, 1921, Serial No. 495,665. Divided and this application filed June 17, 1925. Serial No. 37,613.

This invention relates to improvements in car door locking means.

This invention is a divisional application of our pending application Serial No. 495,665, filed August 26, 1921.

One object of the invention is to provide a door lock or latch arrangement for a railway car which is of simple form relatively inexpensive to make, apply and maintain, and which will always insure the doors being fully closed when locked to thereby prevent leakage of the contents of the car while in transit.

Another object of the invention is to provide a door locking mechanism which eliminates the use of chains or equivalent flexible connections, and which is so arranged that as the doors are pushed or kicked to closed position, the mechanism will automatically lock or latch the doors in final closed position.

Another and more specific object of the invention is to provide a shoulder latch element carried by the car and adapted to co-operate with a flanged member on the door to lock the door in closed position.

Other and further objects of the invention will more fully and clearly appear from the description and claims hereinafter following.

In the drawings forming a part of this specification, Figure 1 is a side elevational view of a portion of a hopper car, showing our invention in connection therewith, the parts being in the condition assumed when the doors are in closed and locked position. Figure 2 is an elevational view of the structure as shown in Figure 1, looking from the right towards the left, and Figure 3 is a fragmentary elevational view of the structure showing the latch and associated parts on the door, as viewed in Figure 1 looking from the left towards the right.

Referring to the drawings, the invention is shown as applied to a type of hopper having hoppers transversely aligned, one on each side of the center sill construction of the car. As customary, such hoppers are formed with substantially triangular outer side sheets 220, which slope slightly inwardly and downwardly toward the center of the car. Each of such hoppers is also provided with a downwardly sloping hopper bottom sheet, as indicated at 221, and the opening of each hopper on each side of the car is adapted to be closed by a hopper door or member 222, pivotally mounted to swing about its upper edge on an axis extending transversely of the car. As customary in this type of car, the two transversely aligned doors are adapted to be simultaneously operated by means of a suitable cross-brace extending along the free edges of the doors, such a brace being shown at 224, the same being of channel formation. Ordinarily there will be a brace for the lower edge of each hopper bottom sheet 221 as indicated at 12.

In carrying out our invention we preferably employ similar latching mechanisms at each side of the car and since said mechanisms are similar only one of the same is shown in the drawings, each mechanism including a latching element indicated at A^2, which is fixedly attached to a transversely extending shaft D^2, the latter being rotatably mounted in suitable bearing brackets secured to the hopper bottom sheet 221. The shaft D^2 has squared sections at both ends so that it may be operated from either side of the car. Each latching element A^2 is adapted to co-operate with a corresponding latching element B^2, which in this instance is secured to the door and movable therewith, the same being directly mounted upon the channel brace 224. Each latching element A^2 is formed with a cam edge 229 adapted to co-operate with the edge 236 of the corresponding element B^2 in guiding the parts into operative engagement as the doors are swung into closed position. As will be noted by reference to the drawings the latch element B^2 consists of a flanged member having one flange 10 thereof lying against the web of the channel member 224 being therefore arranged substantially normal to the plane of the door, the other flange 11 being arranged substantially in the plane of the door but preferably curved to correspond with a similarly curved shoulder formed on the latch element A^2. The relation between the latch members A^2 and B^2 is such that when the pivotally mounted element A^2 is in locking engagement with the door, the shoulder thereof will be directly beneath the flange 10 of the member B^2, and furthermore the parts are so arranged that said flange 10 is arranged to lie within the

shoulder of the latching element A^2, closely adjacent the shank thereof, thereby providing against bending of the flanges 10 and 11 especially during the initial stage of the door closing operation, when it is frequently necessary to hammer on the latch to bring the latter to fully locked position beneath the door. As the doors move to closed position the latch A^2 rides on the face of the flange 10 before it drops into engagement with its corrsponding flange 11 on the bracket member B^2.

In said arrangement a supporting plate bracket 50 is applied to the outer side of each hopper, said bracket having a depending vertical web 51 and inturned web 232. The latter, as evident from an inspection of Figure 1, is adapted to co-operate with the shank of the latching element A^2 in limiting the downward movement of the latter under the influence of gravity so that the cam edge 229 will always be in the path of travel of the edge 236. Pivotally mounted on a suitable bolt extending between bracket 50 and the hopper sheet 220 is a locking cam C^2 of sector form, the same being adapted to cam against the upper side of the latching element A^2 and hold the latter in locked position, as shown in Figure 1. A stud bolt 53 is extended from the bracket 50 to the hopper side sheet 220, said bolt 53 acting as a limiting stop to sustain the camming element C^2 when it is thrown to inoperative position, as will be understood. The hub of the camming element C^2 will obviously serve as a limiting stop for the upwardly swinging movements of the latch A^2, thereby preventing the latter from being thrown in a clockwise direction to an inoperative position. The arrangement when operable from both sides may employ only one camming element C^2 since if one latching element A^2 is positively locked, the other will also be locked, inasmuch as both latching elements A^2 are rigidly secured to the shaft D^2.

While we have shown our invention as applied to a hopper car, it is evident that the same is applicable to other types of car and we contemplate all constructions and modifications which come within the scope of the claims appended hereto.

What we claim is:

1. In a dump car, the combination with a fixed body portion and a door; of a shouldered latch pivotally mounted on the fixed body portion, the shouldered portion of the latch being of arcuate form; and a floor beam fixedly mounted on the door, said floor beam having an extension beyond the door engageable with the shouldered latch, said engaging portion of the extension substantially corresponding in contour to the engaging portion of the latch.

2. In a railway car, the combination with a dumping door; of a shouldered latch member pivotally mounted on the car; flanged beam member secured to the do said member having a web substantially no mal to the plane of the door, and a flan angularly related with respect to the sa web, said flange being adapted to se against the shoulder on the latch when t door is in closed position, the parts bei so arranged that when the door is in clos position, the shoulder will directly engag beneath the flange within the plane of sa web.

3. In a railway car, the combination wi the body thereof; of a dumping door; flanged bracket member carried by sa door, said bracket member having o flange lying normal to the plane of the do and having an angularly related flange the end thereof; and a pivotally mounte shouldered latch carried by the car body an adapted to seat beneath the last nam flange, said latch when in engaging positio beneath the bracket being adapted to em brace both of the said flanges.

4. In a dump car, the combination with pivoted door member having a flanged do member extending beyond an edge of th door, said flanged member having angula ly related flanges; a pivoted hook adapted t engage said member, said hook having shank extending across the plane of the doo and a shoulder formed outwardly of sa shank, and disposed below the plane of th door when closed, said hook when in engage relation with the flanged member of the do having the shank immediately adjacent o flange of the said flanged member, and ha ing the said shoulder thereof beneath th other flange.

5. In a dump car, the combination with fixed body portion and a dumping door; o a shouldered latch pivotally mounted on th fixed body portion; a beam extending alon the free edges of the door; a flanged exte sion secured by one of the flanges to th beam, said extension extending beyond a sid edge of the door, the flanged extension ha ing another flange adapted to engage wit the shoulder on the latch to maintain th door in closed position, said extension bei secured to the beam in line with the should on the latch and the pivotal point of sa latch.

6. In a dump car having a dumping doo the combination with a flanged member ca ried by the door adjacent the free edg thereof, said member having one flang lying substantially normal to the plane o the door and having the other flange lyi substantially normal to said first name flange; and a supporting hook on the c body adapted to engage the said flange member, said supporting hook on the c body having a shoulder spaced away fr its pivot, and a shank extending from

Feb. 20, 1923. 1,446,244.

A. CAMPBELL.

DUMP CAR.

FILED MAY 27, 1922. 4 SHEETS—SHEET 1.

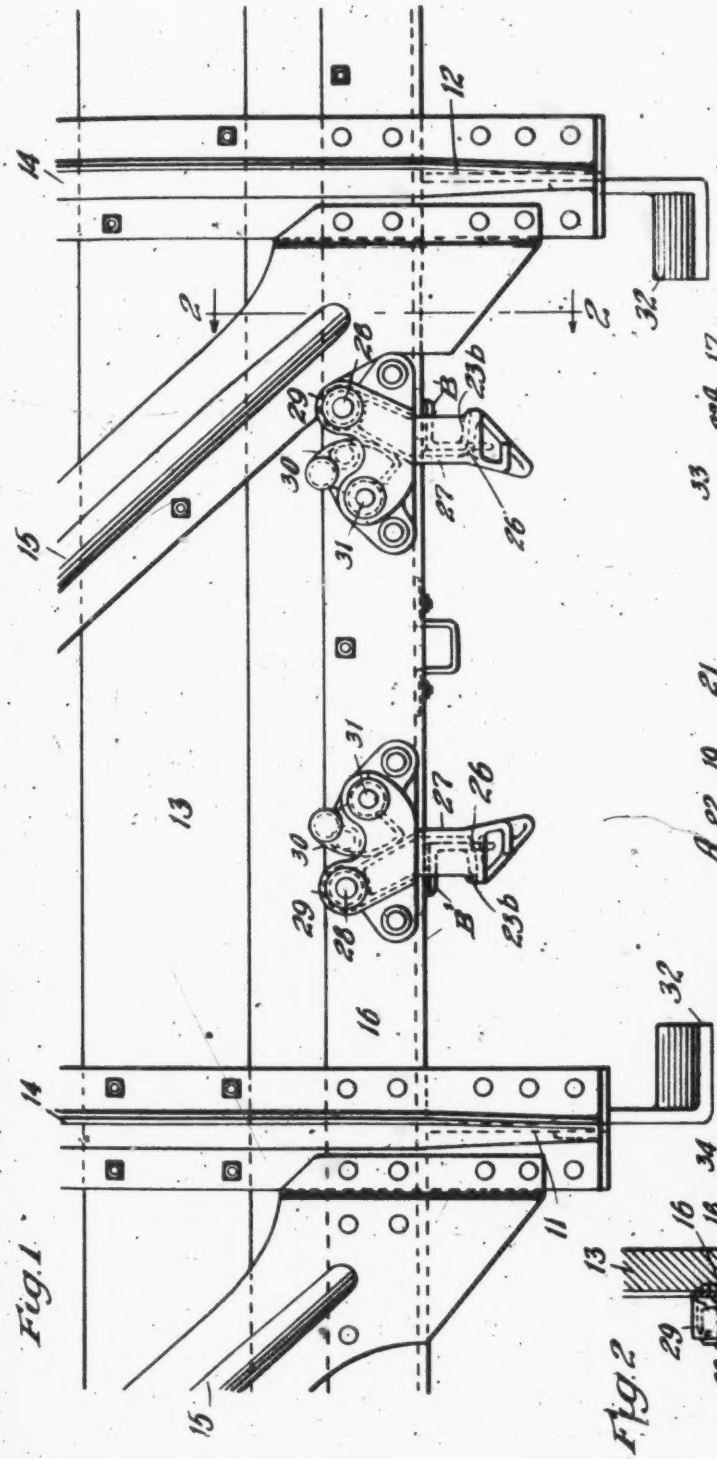

Fig. 1.

Fig. 4.

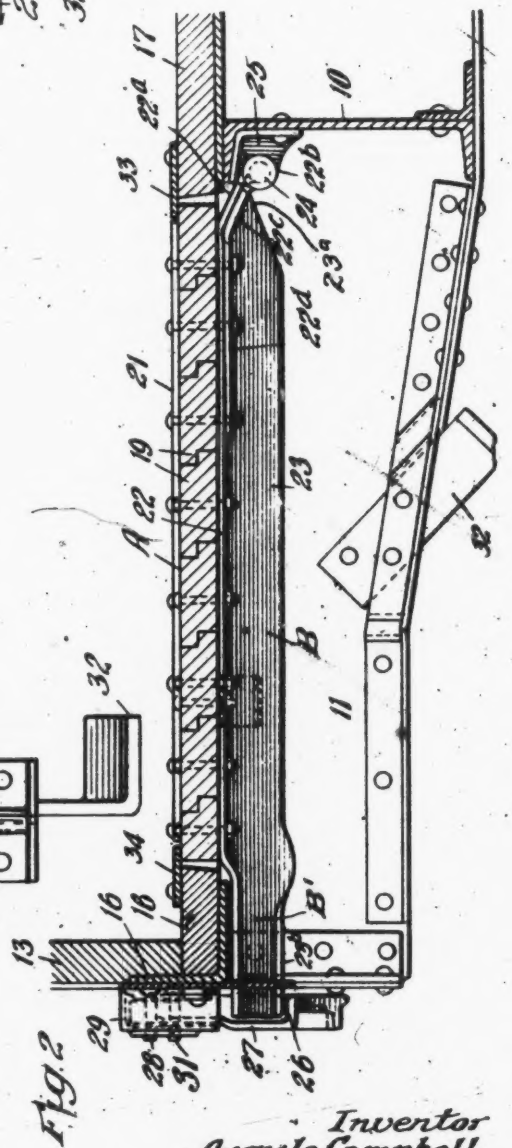

Fig. 2.

Inventor
Argyle Campbell
By Geo. S. Haight
His Atty.

pivot towards said shoulder, said flanged member when in engaged relationship with the supporting hook having one flange lying adjacent the shank of the hook and having the other flange in engagement with the shoulder.

7. In a railway car provided with a hopper having side and bottom walls meeting and forming a corner adjacent the discharge opening, and a pivoted door for closing said opening, the combination with a projection from the door; of a stiffening member secured to the said bottom wall, and projecting outwardly beyond the side wall; a bracket carried by the said stiffening member; a latch having a pivotal connection with the said bracket, said latch being adapted to co-operate with the projecting member on the door; and a wall overlying said latch, said wall being secured to both the side wall of the car and the said stiffening member.

8. In a dump car, the combination with the body thereof; of a dumping door; a beam carried by the door and projecting beyond an edge thereof, said beam having a web substantially normal to the plane of the beam, and a flange outstanding from said web; and a hook pivotally mounted on the car body, said hook having a shank extending adjacent the said beam for its full depth when the door is in closed and locked position, said hook being also formed with a shoulder to seat beneath the outstanding flange of the said beam to lock the door in closed position.

9. In a dump car, the combination with a dumping door; of a reinforcing beam secured thereto; a flanged extension secured to said beam by one of its flanges and adapted to project beyond an edge of the door; a shouldered door locking member pivotally mounted on a fixed part of the car and co-operable with the other of the flanges of the flanged extension to maintain the door in closed position, said flanged extension when the door is in closed position having the securing flange lying within the shoulder of the latch.

10. In a dump car, the combination with the body thereof; of a dumping door; a flanged member carried by said door, said member having one flange lying normal to the plane of the door, and having another flange outstanding from said first flange; and a shouldered member carried by the car body and adapted to seat beneath the last named flange, said shouldered member when the door is moved towards closed position being adapted to ride on the said first flange before locking engagement between said shouldered member and the bracket is effected.

11. In a dump car, the combination with a dumping door member and the fixed body member of the car, one of said members being provided with an angular element and the other of said members with a shouldered latch adapted to co-operate with said angular element to hold the door closed, the parts being arranged whereby the various angular portions of said angular member are juxtaposed with reference to the shank and shoulder of said latch when said door is closed.

In witness that we claim the foregoing we have hereunto subscribed our names this 12th day of June, 1925.

ARGYLE CAMPBELL.
ALBERT E. ZIMMER.

Feb. 20, 1923. 1,446,244.

A. CAMPBELL.

DUMP CAR.

FILED MAY 27, 1922. 4 SHEETS—SHEET 2.

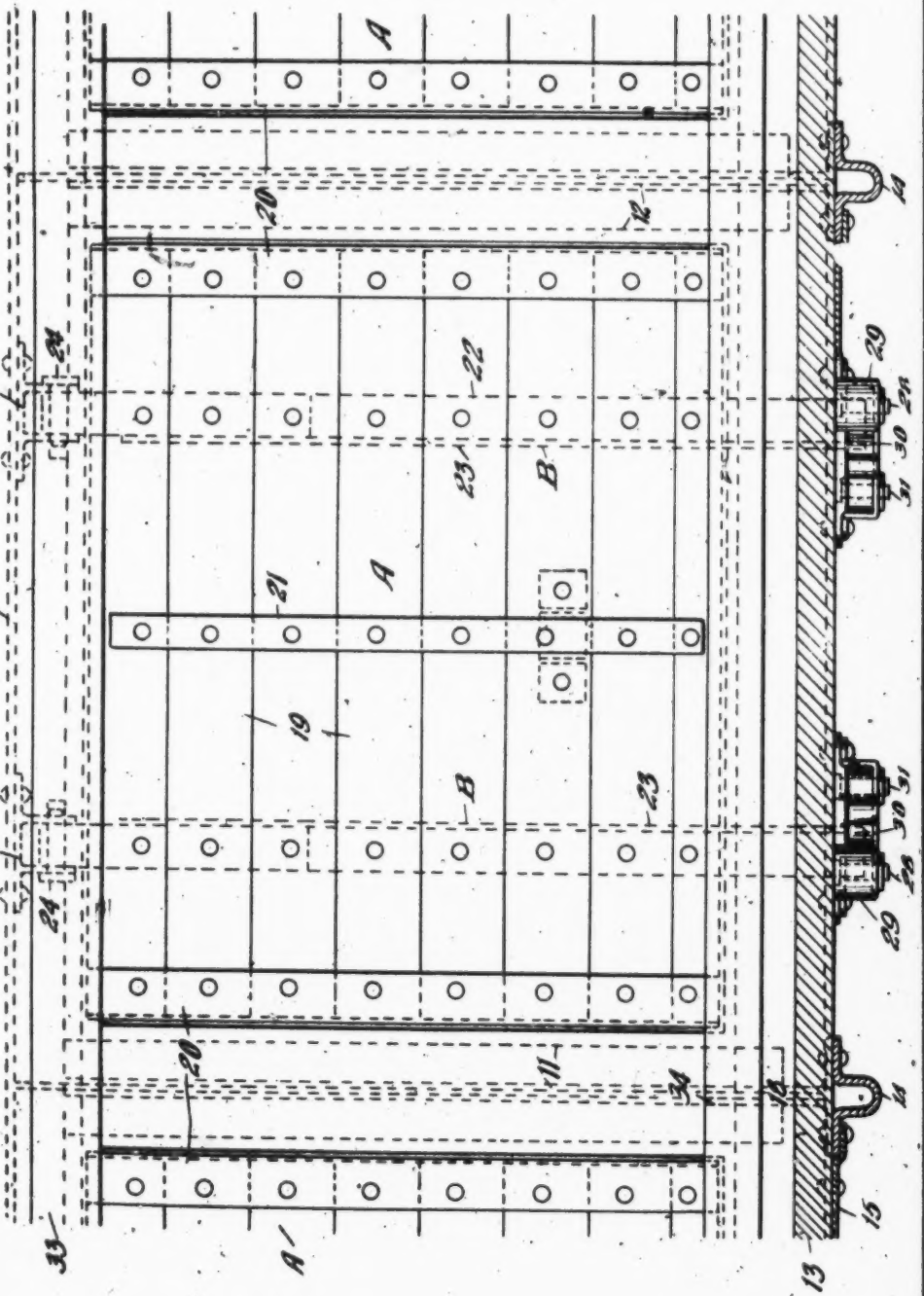

Fig. 3

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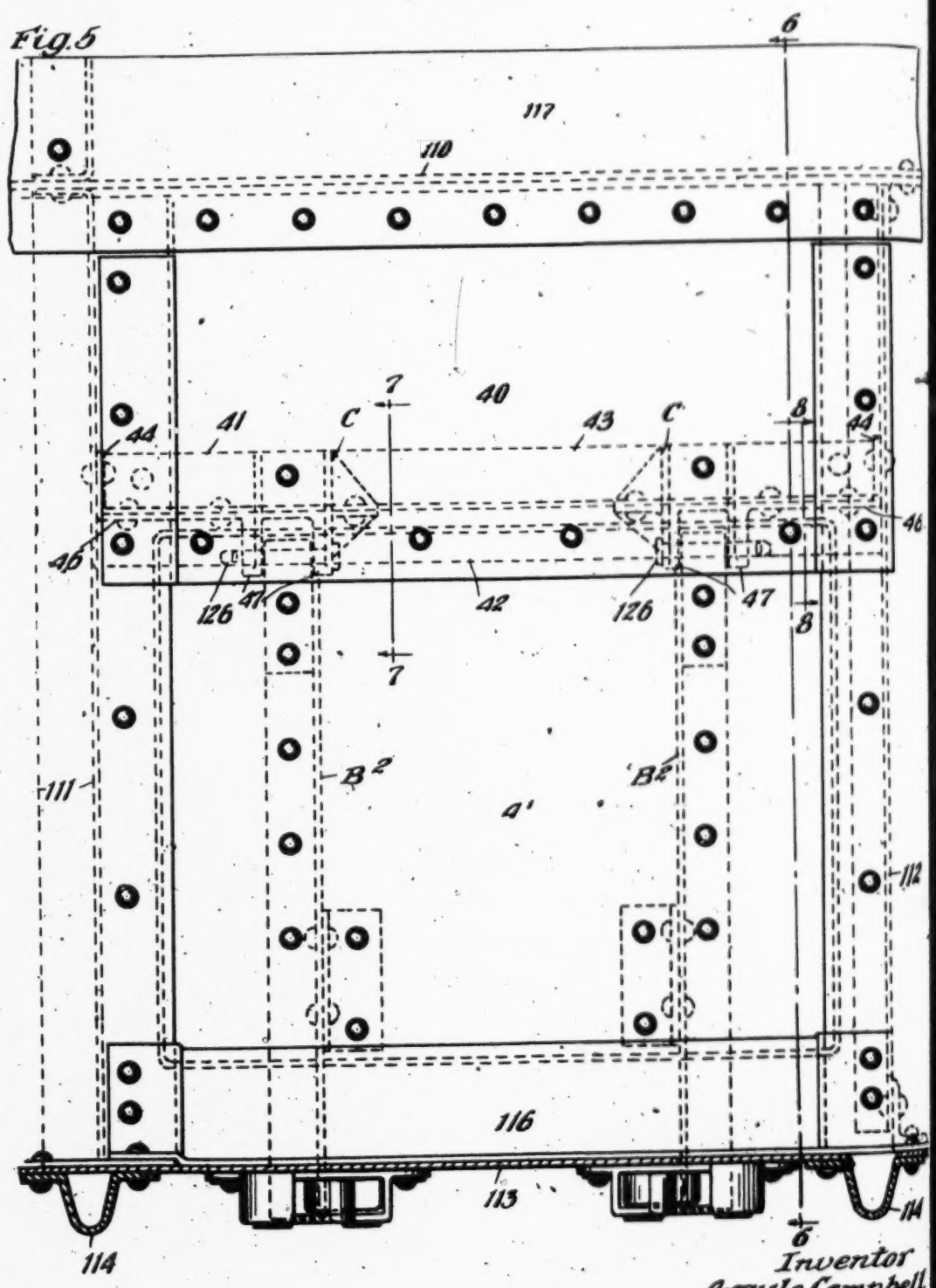
DUMP CAR.

FILED MAY 27, 1922. 4 SHEETS--SHEET 3.

Fig. 5



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Feb. 20, 1923. 1,446,244.

A. CAMPBELL.

DUMP CAR.

FILED MAY 27, 1922. 4 SHEETS-SHEET 4.

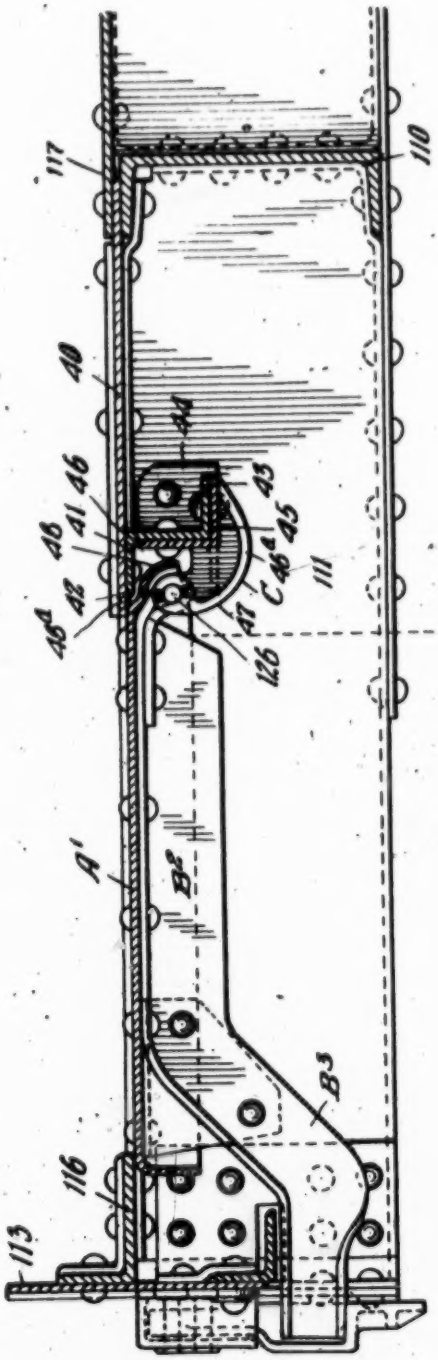

Fig. 6

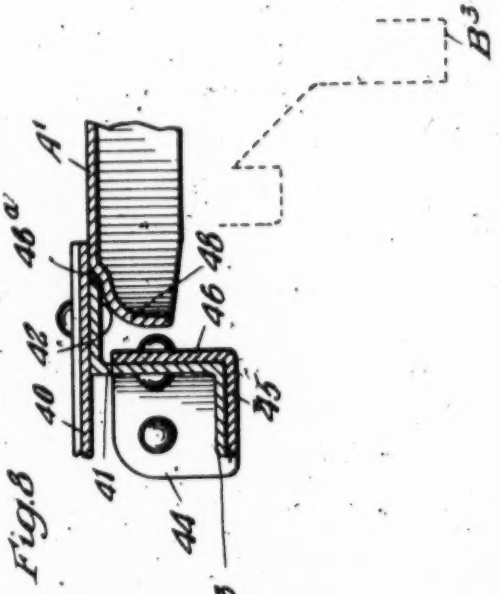

Fig. 8

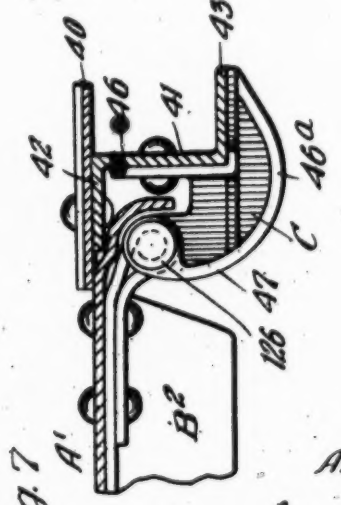

Fig. 7

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Patented Feb. 20, 1923. 1,446,244

UNITED STATES PATENT OFFICE.

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DUMP CAR.

Application filed May 27, 1922. Serial No. 564,050.

To all whom it may concern:

Be it known that I, ARGYLE CAMPBELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Dump Cars, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in dump cars.

One object of the invention is to provide a strong, durable and relatively inexpensive locking mechanism for gravity drop doors of a dump car and more particularly for drop doors of dump cars of the gondola type.

Another object of the invention is to provide a relatively inexpensive combined door brace and hinge strap which may be readily applied to new or old cars.

A further object of the invention is to provide, in a dump car, a novel and efficient combined floor brace and sealing arrangement at the joint between the car floor and the hinge edge of the door in order to prevent any of the load getting in the crack and preventing full closure of the door thereafter.

In the drawings forming a part of this specification, Figure 1 is a side elevation of a portion of a gondola car showing my improvements in connection therewith. Figure 2 is a vertical transverse sectional view corresponding substantially to the section line 2—2 of Figure 1. Figure 3 is a part top plan and part horizontal section of the car shown in Figures 1 and 2 and illustrating more particularly the floor door arrangement and certain details of the side wall construction. Figure 4 is an end elevation, upon a larger scale, of one of the door braces. Figure 5 is a view similar to Figure 3 illustrating another embodiment of the invention. Figure 6 is a transverse vertical sectional view of the car shown in Figure 5, the section corresponding to the line 6—6 of Figure 5. And Figures 7 and 8 are detail vertical sectional views corresponding to the section line of Figure 5, Figure 7 looking in the direction of the arrows 7—7 and Figure 8 looking in the direction of the arrows 8—8.

Referring first to the construction illustrated in Figures 1 to 4, inclusive, the gondola car therein shown is provided with channel center sills 10, diaphragms or needle beams 11, 12, wooden side wall 13, pressed side stakes 14, pressed diagonal braces 15, angle side sill 16, longitudinal center floor plank 17, longitudinal side floor strip 18 and a plurality of pivoted drop bottom doors each of which is designated generally by the reference character A. The number of the floor doors will vary in accordance with the requirements of the different railroads but generally there will be four on each side of the car. Only one of such doors is illustrated in detail in the drawings, it being deemed unnecessary to show or describe any of the others, inasmuch as it will be understood that the arrangement is similar for each door.

Each of the doors A, is preferably composed of a plurality of longitudinally extending shiplapped planks 19—19 bound together by U-shaped binding plates 20—20 at each end of the door and further secured by a top strip 21 located centrally, as best shown in Figure 3. On the under side, each door A is preferably braced or strengthened by novel combined braces and hinge straps indicated generally by the reference character B.

Each of said combined braces and hinge straps B is preferably made of an angle iron which can be obtained from stock, the same being secured to the under side of the door with one flange thereof located at the top as indicated at 22 and secured to the under face of the door and with the other right angular flange 23 extending vertically downwardly. At the inner or hinge edge of the door, the upper flange 22 is extended beyond the door edge and bent downwardly for a short distance as indicated at 22^a, thence bent in the form of a circle, as indicated at 22^b around a hinge pin 24, the remainder of the flange being thence doubled back against the section 22^a as indicated at 22^c and thence horizontally beneath the door as indicated at 22^d. The other flange 23 is extended up to the hinge pin and beveled off as indicated at 23^a so that a strong brace is supplied for the flange sections 22^a and 22^c right up to the hinge or pivotal connection. The hinge pins 24 are mounted in hinge

butts 25 which are riveted in the upper corners of the corresponding channel center sill 10, as shown in Figure 2.

At the free edges of the door, the braces B are extended beyond the edge of the door and downwardly bent for a slight distance as indicated at B'. At a point approximately directly below the free edge of the door, the depending flange 23 of the brace is bent out of the main plane of said flange 23 in a more or less horizontal direction as indicated at 23^b so that, looking at the end of the brace B, it has the form more or less of a channel cross section, as clearly indicated in Figure 4. The flange section 23^b is preferably curved on a radius about a center which is located above the door so as to cooperate with a correspondingly curved supporting shoulder 26 on a pivoted latch 27. The latter is pivotally supported on the outer face of the car side wall as indicated at 28 in a casting 29. The latch 27 may be held in locked or operative position by a cam plate 30 also pivotally supported in the casting 29 at the point 31. As best shown in Figure 1, the pivotal support 28 is located to one side of a vertical line passing through the flange section 23^b and to that side of said vertical line which will cause the curved shoulder 26, as it engages the correspondingly curved flange section 23^b, to wedge against the latter and thus forcibly elevate the door to fully closed position. By forming the brace B at its outer end as above described, it will be observed that I obtain a very strong section, inasmuch as I retain a part of the vertical web 23 as a compression element in sustaining the load on the door and thus eliminate or at least minimize tendency of the flange section 23^b to give or bend under load as it might otherwise do. In actual practice, there will preferably be two of the combined braces and hinge straps B for each door and two corresponding pivoted gravity latches cooperable with the outer extended ends thereof.

In the gondola car shown in Figures 1, 2 and 3, the same is of the type known as composite and the doors are relatively wide, extending substantially from the center sill to the plane of the side wall. With doors of such width, it is inadvisable to allow them to fall to a depending vertical position on account of interference with the rail and consequently I have shown stop plates 32 secured to the needle beams 11 and 12 which will limit the opening movement of the doors. Preferably also I employ a longitudinally extending cover plate 33 secured to the center plank 17 and extended a slight distance beyond the free edge thereof over the joint between the door and the plank to prevent as much as possible, any of the load getting in the cracks. A similar cover plate 34 may be employed along the free edges of the doors, as clearly shown in Figure 2.

Referring next to the construction illustrated in Figures 5 to 8 inclusive, the gondola car therein shown is of the all steel type, the same having center sills 110, transverse needle beams 111 and 112, side wall [illegible] side stakes 114, angle side sills 116, and longitudinally extending center cover plate [illegible] over the center sills. In this form of gondola car, the width of the doors is much considerably less than in the composite type, there being a floor section 40 extending from the center sill about one-third of the distance toward the side wall of the car. The floor doors are indicated at A', the same being relatively narrow and having their free edges engaging beneath the horizontally extending flange of the side sill 116, as best shown in Figure 6. Each of the doors A' is preferably provided with a combined brace and hinge strap B^2 formed in the same manner as the corresponding door member B, heretofore described. In this connection, it will be observed from examination of Figure 6, that the outer end B' of each brace B^2 is deflected downwardly to a much greater extent than in the construction heretofore described in order to pass below the side wall of the car, which is extended below the level of the floor. The outer end of the brace B^2 is formed in the same manner as the outer end of the brace B and similar latches are adapted to cooperate therewith and need not be redescribed.

In order to brace the longitudinally extending outer edges of the floor plates 40 where the doors are hinged thereto, between the needle beams 111 and 112, I secure to each floor plate 40, a Z-bar 41, having its upper flange 42 extended outwardly, that is, toward the door opening, and the lower flange 43 extended in the opposite direction or inwardly toward the center sill. Each Z-bar 41 extends substantially from needle beam to needle beam and has secured thereto at each end, complementary hinge butt castings C. Said castings C are made right and left and it will only be necessary to describe one of them in detail.

Referring more particularly to Figures 6, 7 and 8, each of said castings C is formed at its end with a flange 44 extending in a vertical plane transversely of the car and adapted to be directly riveted to the corresponding needle beam 111 or 112, it being understood that said flange 44 extends across the end of the Z-bar 41. Each casting C is further provided with a horizontally extending flange 45 located beneath and secured to the bottom flange 43 of the Z-bar and with a further vertical flange 46 overlapping and riveted to the web of the Z-bar.

At the inner end of each casting C, that is, the end removed from the corresponding needle beam to which it is secured at its other end, each casting C is provided with a part

of spaced vertical flanges 47—47 which are extended upwardly to a point beneath the Z-bar flange 42 and free edge of the floor plate 40, as best indicated in Figures 6 and 7. Said spaced flanges 47 are suitably reinforced by edge ribs 46ª and together provide pivotal supports for a hinge pin 126.

Each of the doors A', as previously described, is preferably made of sheet metal and to insure the necessary strength, each door has a depending flange around each edge thereof. Along its hinge edge, said flange, indicated at 48, is slightly indented as indicated at 48ª to clear the free edge of the Z-bar flange 42 and thence is curved on a radius concentric with the hinge pins 126. When the door is in closed position, as shown in Figure 6, it is evident that a comparatively tight seal is obtained between the hinge edge of the door and the floor plate 40 and furthermore, as the door swings to its fully open position, the curved flange 48 and Z-bar flange 42 will maintain their tangential relation, thus preventing any of the load getting in between the door and fixed part of the car and insuring easy closing of the door.

In the arrangement shown in Figures 5 to 8, on account of the door being comparatively narrow, the same may be allowed to swing to a depending vertical position as indicated by dotted lines in Figure 6, the door clearing the rail, a portion of the latter being indicated conventionally. This allows of 100% door opening and easy discharge as will be understood by those skilled in the art.

One advantage of the combined floor brace and hinge butt structure just described resides in the fact that the castings C may be made of standard patterns and combined with a Z-bar for any car, regardless of the distance between the needle beams or diaphragms, inasmuch as the Z-bar may obviously be cut to any desired length so that the castings C can always be riveted directly to the needle beams. This is of considerable advantage over braces of the ordinary cast type which require separate patterns for cars having different spacing between needle beams.

I claim:

1. In a dump car having a pivoted gravity drop door, the combination with a brace secured to the under side of the door and extended outwardly beyond the free edge thereof, said brace, at its outer end, having a top flange parallel to the plane of the door, a web perpendicular to the plane of the door, and a bottom flange substantially parallel to the plane of the door; of a hook latch pivoted to swing in a plane substantially perpendicular to the plane of the door when closed and adapted to engage under said bottom flange of the brace.

2. In a dump car having a pivoted gravity drop door, the combination with a brace secured to the under side of the door and extended outwardly beyond the free edge thereof, said brace being of angular cross section beneath the door and of approximately channel cross section at its extended end; of a latch pivoted to the car body adapted to engage under said extended end of the brace to hold the door in closed position.

3. In a dump car having a pivoted discharge door, the combination with a brace secured to the underside of the door and extended outwardly beyond an edge thereof, said brace, at its extended end, being of approximately channel cross section with one of the flanges thereof slightly curved; of a latch pivoted to the car body, said latch having an approximately right angled shoulder, one face of which is curved to engage said curved flange of the extended end of the brace.

4. In a dump car having a flat floor section and a pivoted discharge door in approximate alinement with said floor when in closed position, the combination with a combined brace and hinge strap of angular cross section secured to the door, one flange of said brace being secured to the under face of the door and extended beyond the pivoted edge thereof and inclined downwardly from the plane of the door, then bent back upon itself to a point beneath and secured to the door, the other flange being disposed perpendicular to the door; of a pivot pin extended through the doubled-over portion of said brace flange and by which the door is adapted to be hinged to the car body, said pivot pin being secured to the car body below the floor and inwardly of the outer edge thereof.

5. In a dump car having a flat floor section and a pivoted discharge door in approximate alinement with said floor when in closed position, the combination with a combined brace and hinge strap secured to the door, said brace and strap being of angular cross section throughout the greater portion of its length with one flange secured to the under side of the door and the other perpendicular thereto, said flange secured to the door being extended beyond the pivoted edge of the door and doubled back upon itself and the other flange terminating adjacent the bend in said doubled-over flange; of means for pivotally connecting said strap to a fixed part of the car body, at a point below the under surface of the door and said floor, and inwardly of the outer edge of the latter.

6. In a dump car having a floor with a door opening therein, the combination with a door hinged to swing about an axis disposed beneath and inwardly of an edge of said floor, said door having a rounded edge substantially concentric with said axis and adapted to remain substantially tangent to

the under side of the floor edge, in all positions of the door, the planes of the upper surfaces of the door, when in closed position, and said floor substantially co-inciding; of a combined brace and hinge strap secured to said door, said brace and strap being of angular cross section throughout the greater portion of its length, with one flange secured to the under side of the door and the other flange perpendicular thereto, said first named flange being extended beyond the pivoted edge of the door and doubled back on itself, said doubled portion being concentric with said rounded edge; a pivot pin extending through the doubled portion of said brace and by which the door is adapted to be hinged; and means for holding the door in closed position.

7. In a dump car having a floor with a door opening therein, the combination with a door adapted to close said opening and hinged to the car body to swing about an axis beneath one edge of the floor, said door having a rounded edge substantially concentric with said axis; of a longitudinally extending floor brace secured to said edge of the floor on the under side thereof, said brace being of Z-cross section with one flange extended toward the door opening and secured to the floor and the other flange extended away from the door opening, said rounded edge of the door remaining substantially tangent to said first mentioned flange of the brace in all positions of the door.

8. In a dump car having a floor with a door opening therein, the combination with a Z-brace secured to the under side of said floor and extending along one edge of the door opening; of a pair of cast hinge butts secured to said brace; and a door adapted to close said opening and pivoted to said butts, said door having a rounded edge substantially concentric with its axis of pivotal movement.

9. As an article of manufacture, a floor brace for cars, said brace comprising a section of a commercially rolled shape and two hinge butt castings secured to said shape, said castings having separate means thereon for attaching the same to underframe elements of a car body.

10. As an article of manufacture, a combined floor brace and hinge butt comprising, an intermediate section of Z-cross section and two end castings secured to said Z-section, each of said end castings having a hinge butt proper secured to two of the angularly disposed portions of said Z-section and an end flange by which the same may be secured to an element of the car underframe.

11. In a dump car having a floor with a door opening therein, the combination with a brace secured to the car floor adjacent the door opening and extending parallel therewith, said brace being of substantially Z-cross section; of a door pivotally attached to said brace, said door having braces on the under side thereof extended outwardly beyond the free edge of the door, said door braces being of angular cross section beneath the door proper and of approximately channel cross section at their outer ends; and pivoted latches cooperable with the extended ends of said door braces to hold the door in closed position.

12. In a dump car of the gondola type having a floor with a door opening therein, the combination with a brace secured to the under side of the floor adjacent one edge of the door opening, said floor brace comprising a section of Z-bar and end hinge butt castings secured to the Z-bar; of a floor door having its hinge edge rounded and adapted to remain substantially tangent to one flange of the Z-bar in all positions of the door; combined door braces and hinge straps secured to the under side of the door and by which it is pivoted to said floor brace, said door braces being extended beyond the free edge of the door; and means cooperable with the extended ends of said floor braces for holding the door in closed position.

13. In a dump car of the gondola type having a floor with a door opening therein, the combination with a floor brace extending parallel to one edge of the door opening, said floor brace comprising a section of Z-bar and end hinge butt castings secured to the Z-bar; of a floor door having a rounded flange extending along its hinge edge; combined braces and hinge straps secured to the under side of said door, each of said combined door braces and hinge straps being of angular cross section beneath the door proper and extended outwardly beyond the free edge of the door, the extended ends of said door braces being of approximately channel cross section; and latches pivotally secured to the side wall structure of the car and cooperable with said extended ends of the door braces to hold the door in closed position.

14. In a dump car having a pivoted gravity drop door, the combination with a brace secured to the under side of the door and extended outwardly beyond an edge thereof, said brace being of substantially angular cross section beneath the door and of approximately channel cross section at its extended end; of supporting means pivoted to the car body adapted to engage under said extended end of the brace to hold the door in closed position.

15. As an article of manufacture, a brace for cars, said brace comprising a section of commercially rolled shape and two end castings rigidly secured to said section at the opposite ends thereof, said end castings having means thereon, extending across the ends of said section, for attaching the castings to

fixed elements of the car body extended transversely to the direction of the brace.

16. In a dump car having a floor, side wall and side sill depending below the level of the floor, the combination with a floor door pivoted to swing about an axis parallel with the side sill and located an appreciable distance from the center sill of the car, the free edge of the door, in closed position, terminating inside the inner plane of the side wall; of an arm secured to the under side of the door and extended downwardly and outwardly from the free edge thereof to a point below and beyond the outer plane of the side sill; and means located outwardly of the outer plane of the side sill, cooperable with said arm to hold the door in closed position, said door being adapted to fall to a depending position and with the said extended arm therefrom clear of the rail.

17. In a dump car having a floor and side wall, the combination with a floor door pivoted to swing about an axis parallel with the side wall; of an arm secured to the under side of the door and extended outwardly from the free edge thereof, said extended portion of said arm being bent downwardly at an angle to the major portion thereof and terminating in a reversely bent outer end portion, the distance from the pivoted axis of the door to the outer end of the arm being less than the distance between said pivoted axis and the nearest rail; and means cooperable with said outer end portion of said arm to hold the door in closed position.

18. In a dump car having a floor, side wall, and side sill depending below the level of the floor, the combination with a floor door pivoted to swing about an axis parallel with the side sill; of an arm of angular cross-section with the flanges thereof perpendicular to each other and extending from end to end of said arm, one of said flanges being secured to the under side of the door and said arm being bent downwardly and outwardly from the free edge of said door; and means cooperable with the outer end portion of said arm to hold the door in closed position.

19. In a dump car having a floor, side wall, center sill and a side sill, depending below the level of the floor, the combination with a floor door pivoted to swing about an axis parallel with the center sill and located an appreciable distance laterally from the center sill, the free edge of the door, in closed position, terminating inside the inner plane of the side wall; of means for holding the door in closed position, including an extension from the free edge thereof, the distance from the pivotal axis of the door to the outer end of said extension being less than the distance between said pivotal axis and the nearest rail, whereby said door is adapted to fall to a depending position with the extension clear of the rail.

In witness that I claim the foregoing I have hereunto subscribed my name this 22nd day of May, 1922.

ARGYLE CAMPBELL.

Witnesses:
UNA C. GRIGSBY,
ANN, BAKER.

Aug. 14, 1923. 1,464,746

A. CAMPBELL

DUMP CAR CONSTRUCTION AND DOOR LOCKING MECHANISM THEREFOR

Filed Dec. 10, 1921 2 Sheets-Sheet 1

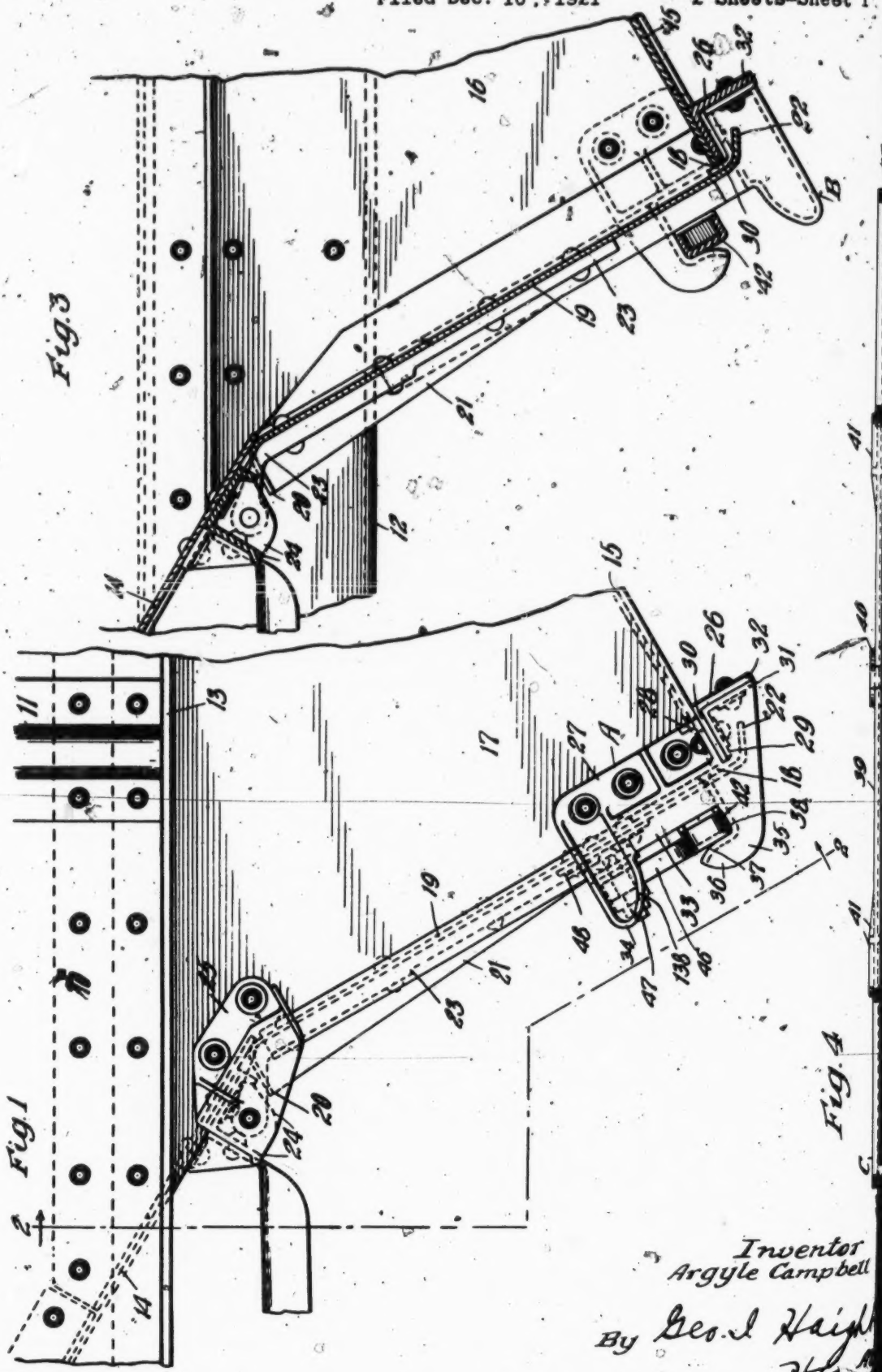

Fig. 3

Fig. 1

Fig. 4

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Aug. 14, 1923. 1,464,746

A. CAMPBELL

DUMP CAR CONSTRUCTION AND DOOR LOCKING MECHANISM THEREFOR

Filed Dec. 10, 1921 2 Sheets-Sheet 2

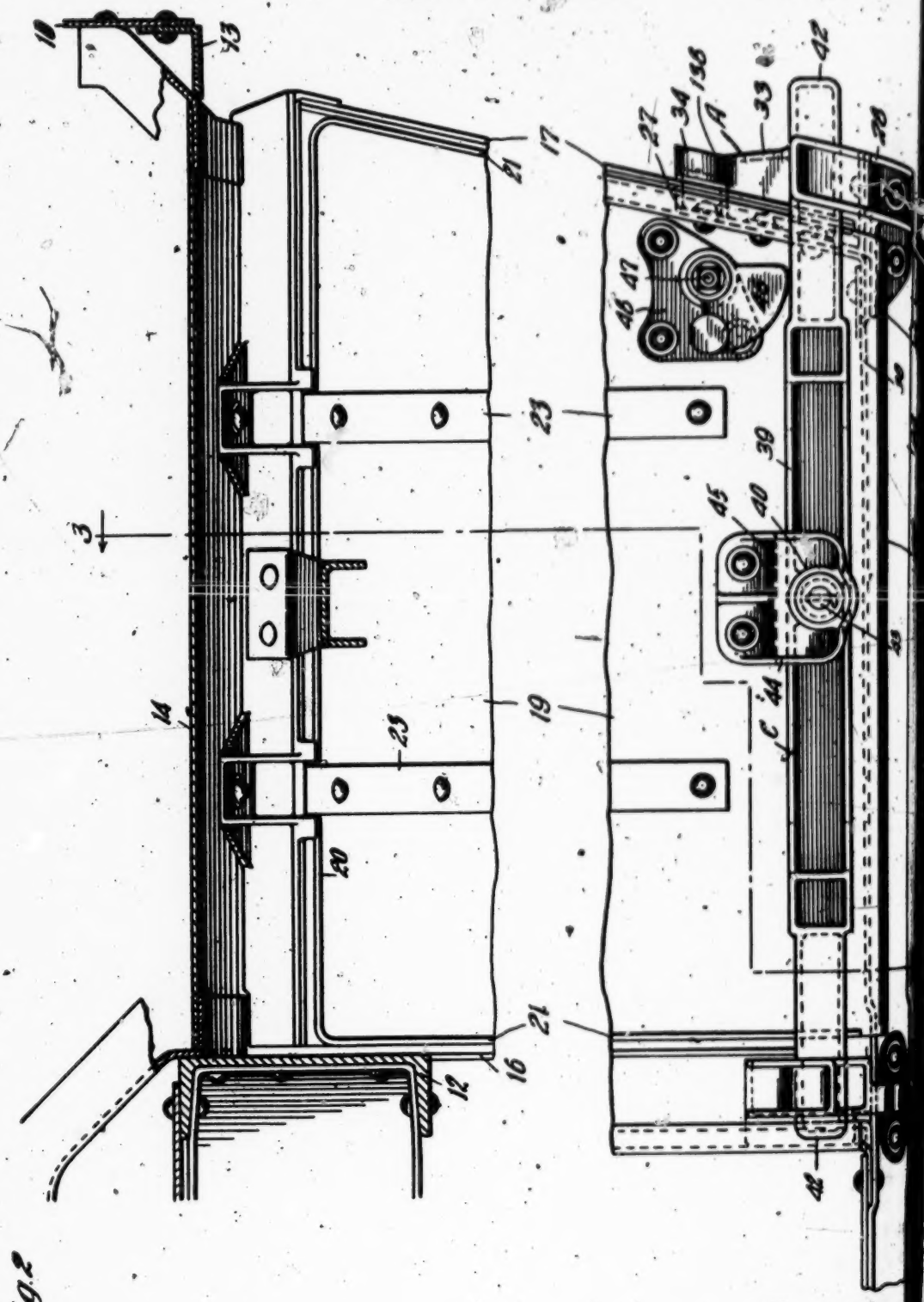

Fig. 2

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Patented Aug. 14, 1923. 1,464,746

UNITED STATES PATENT OFFICE.

ARGYLE CAMPBELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO ENTERPRISE RAILWAY EQUIPMENT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DUMP-CAR CONSTRUCTION AND DOOR-LOCKING MECHANISM THEREFOR.

Application filed December 10, 1921. Serial No. 521,293.

To all whom it may concern:

Be it known that I, ARGYLE CAMPBELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Dump-Car Construction and Door-Locking Mechanism Therefor, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in dump car construction and door locking mechanism therefor.

One object of the invention is to provide a simple, efficient and comparatively inexpensive locking arrangement for dump car doors.

Another object of the invention is to provide a combined door locking bar and reinforcing brace for sheet metal flanged doors.

Another object of the invention is to provide certain reinforcements for a car construction at points adjacent the door opening to overcome weaknesses heretofore encountered at such points, certain of said reinforcing parts being also employed as a part of the door locking means.

In the drawings forming a part of this specification, Figure 1 is a broken side elevational view of a portion of a dump car of the so-called W-type showing my improvements in connection therewith. Figure 2 is a broken, sectional view taken transversely of the car and corresponding substantially with the broken section line 2—2 of Figure 1. Figure 3 is a vertical, sectional view taken lengthwise of the car and corresponding substantially to the section line 3—3 of Figure 2. And Figure 4 is a plan view of the locking bar, detached.

In said drawings, 10 denotes one of the side walls of the car, 11 one of the side stakes, 12 one of the channels employed to make up the girder center sill of well known form and 13 a longitudinally extending reinforcing angle for the side wall 10 of the car.

As customary in the W type of car, a central transversely extending ridge is formed as by the ridge sheet 14, it being understood that there are four hoppers in the car, two on each side of the center sill and arranged series transversely of the car. Each such hopper is defined by a sloping bottom hopper sheet 15, a vertical inner side hopper sheet 16, and an outer side hopper sheet 17, the latter sloping inwardly toward the longitudinal center line of the car. Said sheets are riveted to fixed parts of the car and to each other and, as will be obvious, intersect or merge at the lower portion of the discharge opening at corners, one of which is indicated at 18 in Figure 1. Heretofore, considerable difficulty has been experienced in maintaining said corner portions of dump cars, due to the fact that the sheet metal is necessarily bent and more or less stretched in the bending operation, thus weakening the sheet metal and allowing the same to tear or more easily corrode than at other parts of the sheets which are not subject to deformation. One of the objects of my invention, as heretofore stated, is to reinforce cars at these points of weakness, so as to minimize the cost of maintenance.

Each discharge opening, in the type of car shown in the drawing, is adapted to be closed by a sheet metal door 19 which is preferably flanged all around its edges so as to provide a top horizontally extending flange 20, side flanges 21—21 and a free edge flange 22. The latter is extended inwardly from the main plane of the door, as best shown in Figures 1 and 2, in order to provide a better seal whereas the other flanges 20 and 21 are extended perpendicularly outwardly from the main plane of the door, as customary. Said door 19 is pivotally attached by suitable hinge butts 23—23 to a combined reinforcing brace and hinge butt 24 which is secured to the under side of the ridge sheet 14 adjacent the upper edge of the discharge opening. Said combined brace and hinge butt 24 preferably extends from the channel sill 12 to the outer side of the car where it is formed with suitable flanges 25 fitting over the outer side hopper sheet 17 and also over the end of the line of meeting of the door and ridge sheet 14 so as to brace and reinforce these corner portions of the sheet metal structure and prevent tearing or corroding thereof, all as more fully described and claimed in my co-pending application, Serial No. 521,292 filed December 10, 1921. The hopper bottom sheet 15 is ordinarily reinforced by an angle iron such as indicated at 26 in Figures 1 and 2, said

angle iron being riveted to the lower edge of the sheet 15 and extending lengthwise thereof for the full width of the discharge opening.

To reinforce and strengthen the corners defined at the lower portions of the discharge opening of each hopper, I provide bracket castings or members designated generally by the references A and B. Each of said bracket castings or members A and B is of substantially identical construction except that, with respect to certain features cooperable with the pivoted locking bar C hereinafter described, said features are reversed in position on account of the opposite directions of swing of the end portions of the bar C. A detailed description of one of said bracket castings A or B will be sufficient for an understanding of the invention.

Referring now more specifically to the bracket casting A, which is shown on the outer side of the car, it will be noted that the same is formed with a flanged section 27 fitting against and riveted to the inclined side hopper sheet 17, said flanged section 27 extending from a point flush with the under side of the bottom sheets 15 upwardly and parallel to the edge of the side hopper sheet 17. At the bottom of the flanged section 27, the bracket casting A is provided with an outwardly extended flange 28 riveted to one of the flanges of the correspondingly extended end of the angle iron 26 so that the latter is securely tied with the side hopper sheet 17, thus reinforcing the corner and preventing the bottom sheet 15 from tearing out, under load, from the side hopper sheet 17.

The bracket casting A is also provided near the bottom thereof with a transversely extending flange 29 as best indicated in Figure 2 which fits under and is riveted to the upper flange 30 of the angle iron 26. The casting A is provided with an additional flange 31 extending at right angles to the flange 29, which flange 31 is riveted to the other flange 32 of the angle iron 26.

Extended in a downwardly inclined direction from the main flange section 27, the casting A is provided with a hollow channel-shaped section 33 located outside of the plane of the side hopper sheet 17 and extending beyond the free edge of said sheet 17 so as to overlap the corresponding edge flange 21 of the door. From the channel section 33 is extended a top arm 34 and a lower arm 35, the latter having an upstanding lug 36 which is slightly rounded on its inner side as indicated at 37 and providing a square shoulder 38 arranged parallel to the main plane of the door 19, when the latter is in closed position. The upper arm 34 is formed on its under side with a cam guiding surface 138 opposite the lug 36 for the purpose hereinafter described. With the construction described, it will be seen that the bracket casting A may be said to have a recess therein with an entrance opening defined by the lug 36 and the cam guiding edge 138, to accommodate the end of the latch bar C, the latter engaging behind the shoulder 38.

While the bracket casting A has been described in detail, it will be observed that the other bracket casting B, shown best in Figure 3, is substantially identical, except that the arms and lugs 34, 35 and 36 are reversed.

The locking bar C, preferably in the form of a suitable casting, consists of a longitudinally extending main section 39 with a centrally disposed hub 40, two inwardly extending bearing lugs or enlargements 41—41 on opposite sides of the center, and somewhat reduced ends 42—42. The ends 42 extend beyond the side edges of the door and just clear the edges of the door side flanges 21—21, which is made possible on account of the hub 40 which serves to space the main section 39 of the bar away from the main plane of the door. The locking bar C is pivotally attached at substantially its central point to the door by means of a suitable pivot pin 43 extended through the hub and mounted in a suitable bearing bracket 44 riveted to the door. By providing the bearing lugs or enlargements 41, it will be seen that the locking bar C has three points of bearing contact with the door, that is, at the center and at points near the side edges thereof so that the locking bar functions as a reinforcing brace or strut for the free edge of the door while at the same time allowing the bar to clear the side flanges of the door without in any wise destroying the strengthening effect of the flanges 21. The bar C is oscillatable with respect to the bracket 44 a limited distance, the amount being determined by a flange 45 on the bracket 44 so spaced as to allow the bar C to swing from behind the shoulders 38 on the bracket castings A and B and be disengaged therefrom but to prevent the bar C from swinging to an extreme position. The limiting stops formed by said flange 45 also serve to insure positioning of the ends of the bar C so as to engage the cam guiding edges 138 of the corner bracket castings when the door is swung to closed position, as will be understood.

To hold the locking bar C in its operative closed position, a cam plate 46 is employed, the same being pivotally mounted as indicated at 47 on a suitable plate 48, the latter being riveted to the under side of the door 19.

From the preceding description, it will be seen that the bracket castings A and B not only serve to securely tie together the various hopper sheets at the corner points mentioned and to reinforce the same but also function as parts of the door locking mecha-

nism, thus reducing the number of parts required and the cost of manufacture and application.

As will be understood by those skilled in the art, the invention may be applied to various other types of cars than the one shown, and many changes made in the details of construction and arrangement of parts without departing from the spirit of the invention. All changes and modifications are contemplated that come within the scope of the claims appended hereto.

I claim:

1. In a car having a discharge opening defined by sheets extending in different planes and forming a corner; the combination with a reinforcing member secured to said sheets at said corner, said member having flanged portions extending in corresponding different planes and overlying the sheets; of a pivotally mounted door; and cooperable means on the door and said member for locking the door in closed position.

2. In a car having a discharge opening defined by sheets extending in different planes and forming a corner; the combination with a reinforcing member of commercial shape extending lengthwise of the free edge of one of said sheets and secured thereto; of a reinforcing corner casting secured directly to a flange of said member and having a portion thereof overlying and secured to the adjacent corner-forming sheet, to thereby tie together the corner-forming sheets.

3. In a car having a discharge opening defined by sheets extending in different planes and forming a corner; the combination with an angle iron extending lengthwise of the free edge of one of said sheets and secured thereto; of a reinforcing corner casting secured directly to a flange of said angle iron and having a portion thereof overlying and secured to the adjacent corner-forming sheet to thereby tie together the corner-forming sheets.

4. In a car having a discharge opening defined by sheets extending in different planes and forming a corner; the combination with a reinforcing member of commercial shape extending lengthwise of the free edge of one of said sheets and secured thereto; of a reinforcing corner casting secured to said member and having a portion thereof overlying and secured to the adjacent corner-forming sheet, to thereby tie together the corner-forming sheets; a pivotally mounted door; and cooperable means on the door and corner casting for locking the door in closed position.

5. In a car having a discharge opening and a pivoted door flanged along its side edges, the combination with a bracket member secured to a fixed part of the car adjacent said discharge opening and the free edge of the door when the latter is in closed position, said bracket member having a shoulder-forming recess located outwardly beyond the adjacent door flange when the door is in closed position; of a locking bar pivotally mounted on the door to swing in a plane parallel to the main plane of the door, said bar having an end thereof cooperable with said bracket to engage behind said shoulder thereon to thereby lock the door in closed position, said bar end being spaced from the main plane of the door, to thereby clear the door flange.

6. In a car having a discharge opening and a pivoted door, the combination with a bracket member secured to fixed portions of the car adjacent the discharge opening and the free edge of the door when the latter is in closed position, said member having a recess therein with an entrance opening thereto, said member having a cam guiding edge on one side of said entrance opening and an arm providing a shoulder on the other side of said opening; of a locking bar pivotally mounted on the door, said bar having an end thereof cooperable with said shoulder, and adapted to be cam-guided through said entrance opening.

7. In car construction having a discharge opening, the combination with a pivotally mounted sheet metal door having the side edges thereof flanged outwardly from the main plane of the door; of a locking bar pivotally attached intermediate its ends to the door and having the main portion thereof spaced outwardly in a plane clear of said door side flanges, said bar having bearing lugs thereon engageable with the main portion of the door at points between said side flanges.

8. In a car construction, the combination with a discharge hopper defined by a bottom hopper sheet and side hopper sheets rigidly united and forming corners at the lower portions of the discharge opening; of a pivotally mounted door adapted to close the discharge opening; reinforcing corner bracket castings at each of said corners, each of said castings having flanged sections overlying and secured to respective adjacent portions of the hopper bottom sheet and corresponding side hopper sheet; and means for locking the door in closed position.

9. In car construction, the combination with a discharge hopper defined by a bottom hopper sheet and side hopper sheets rigidly united and forming corners at the lower portions of the discharge opening; of a pivotally mounted door adapted to close the hopper opening; reinforcing corner bracket castings at each of said corners, each of said castings having flanged sections overlying and secured to respective adjacent portions of the hopper bottom sheet and corresponding side hopper sheet; and means for locking the door in closed position, said

means comprising fixed shoulders formed on said brackets and a locking bar pivotally mounted on the door.

10. As an article of manufacture, a combined corner brace and door locking element, said element having flanged sections extending in different planes and adapted to be secured to correspondingly disposed sheets of a car, said element having also an integrally formed locking shoulder thereon with which is adapted to cooperate a pivoted locking bar.

11. In a hopper car having a hopper defined in part by a sloping hopper bottom sheet and a side hopper sheet, the planes of said sheets intersecting at an angle and both sheets having free edges in part defining the discharge opening, said car having also a hopper door pivoted along its upper edge, a corner brace for said bottom and side sheets, said brace having integral portions overlapping adjacent portions of the bottom and side sheets and extending lengthwise of the free edges thereof, said overlapping portions being arranged to be rigidly united with the respective hopper bottom and side sheets.

In witness that I claim the foregoing I have hereunto subscribed my name this 30th day of November 1921.

ARGYLE CAMPBELL.

Witnesses:
UNA C. GRIGSBY,
ANN BAKER.

ENTERPRISE EXHIBIT 30

Campbell Patent 1,547,638

Issued to A. Campbell July 28, 1925

July 28, 1925. 1,547,638

A. CAMPBELL

CAR DOOR LATCH

Original Filed Jan. 30, 1922 2 Sheets-Sheet 2

Fig. 3

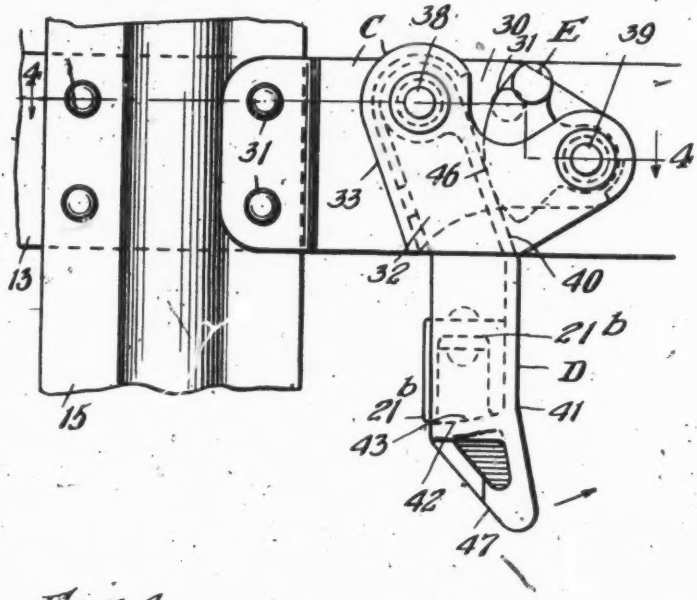


Fig. 4

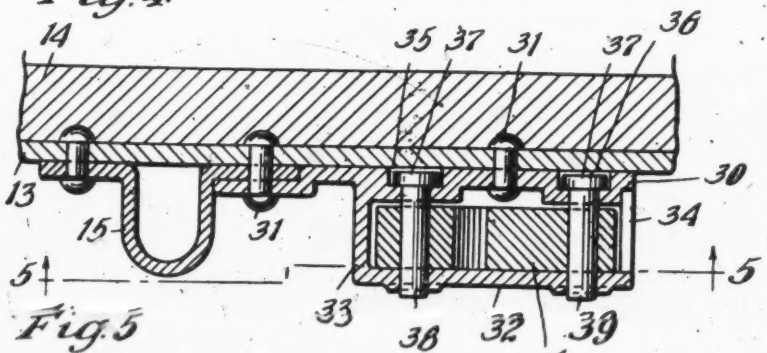


Fig. 5

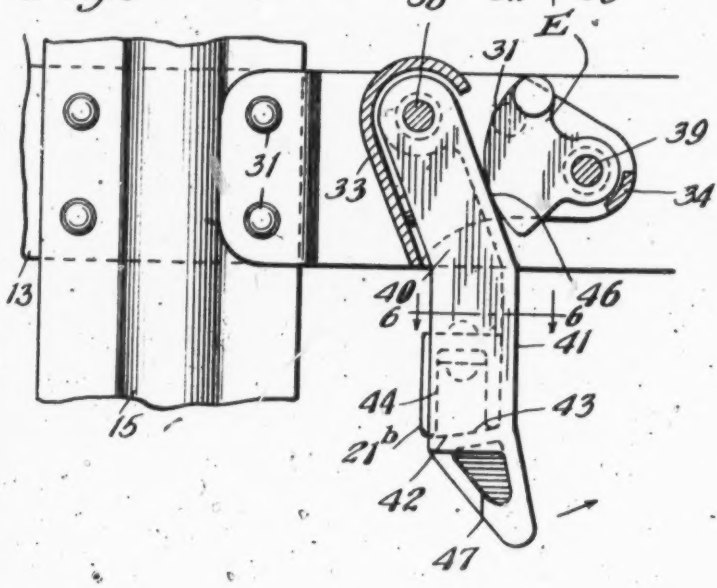
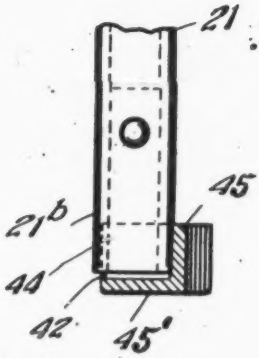


Fig. 6



Inventor
Argyle Campbell
By Geo. I. Voight
His Atty.

July 28, 1925.

1,547,638

A. CAMPBELL

CAR DOOR LATCH

Original Filed Jan. 30, 1922 2 Sheets-Sheet 1

Fig. 1

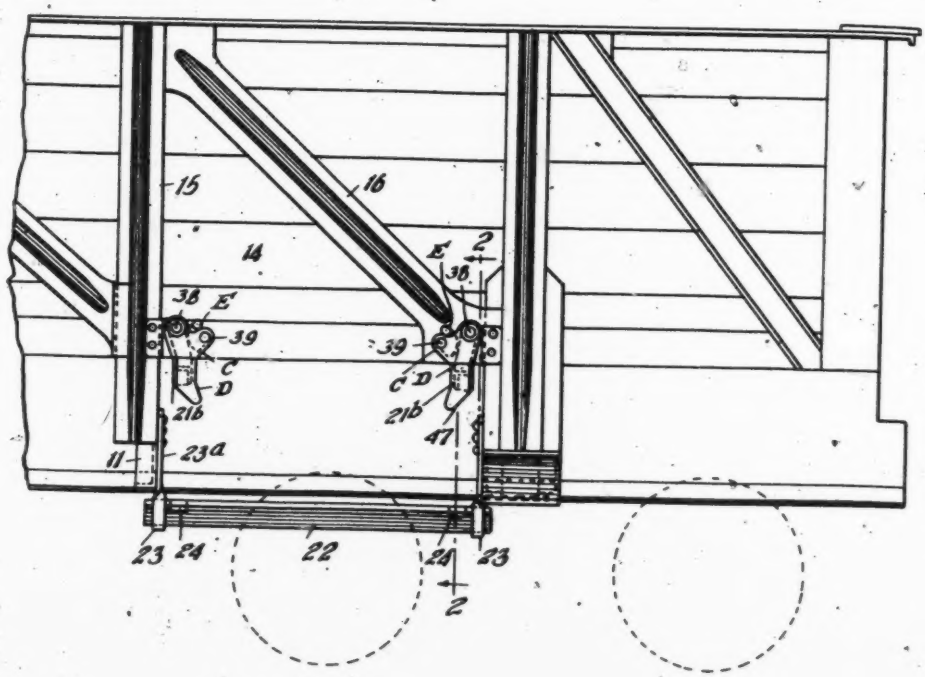
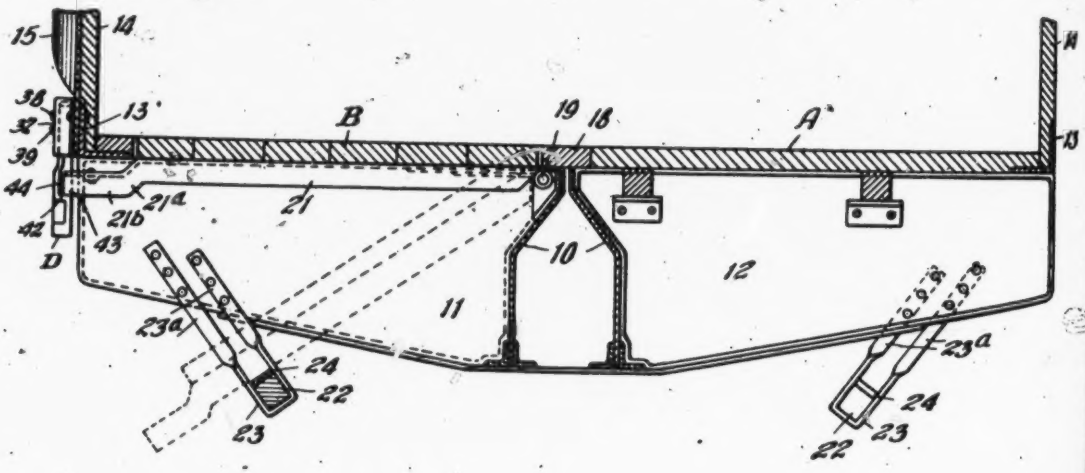


Fig. 2



Inventor
Argyle Campbell

By Geo. I. Haight
His Atty

UNITED STATES PATENT OFFICE.

ARGYLE CAMPBELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO ENTERPRISE RAILWAY EQUIPMENT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CAR-DOOR LATCH.

Original application filed January 30, 1922, Serial No. 532,734, now Patent No. 1,455,520, dated May 15, 1923. Divided and this application filed July 10, 1922. Serial No. 573,847.

To all whom it may concern:

Be it known that I, ARGYLE CAMPBELL, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Car-Door Latches, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to improvements in car door latches, and is especially adapted for locking the doors of railway dump cars.

This application is a division of my co-pending application Serial No. 532,734, filed January 30, 1922, now patent No. 1,455,520, granted May 15, 1923.

The object of my invention is to provide simple and efficient means for locking the doors in closed position.

Another more specific object of my invention is to provide a simple and reliable means for holding the pivot of the latch in assembled relation with the latch carrying bracket.

Other objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawings forming a part of this specification, Figure 1 is a side elevation of part of a dump car showing my improved latch. Figure 2 is an enlarged transverse sectional view corresponding substantially to the section on the line 2—2 of Figure 1. Figure 3 is a side elevational view, on a still larger scale, of my improved door locking latch mechanism. Figure 4 is a horizontal sectional view substantially on the line 4—4 of Figure 3. Figure 5 is a vertical sectional view corresponding substantially to the section line 5—5 on Figure 4. And Figure 6 is a transverse sectional view corresponding substantially to the line 6—6 in Figure 5.

In said drawings, the car is shown as provided with an underframe comprising a ridge shaped center sill 10, cross members, or diaphragms, or needle beams 11 and 12, angle iron side sills 13, side walls 14, side stakes 15, diagonal braces 16, fixed floor sections A, drop bottom doors B, and longitudinally extending cover plates or boards 18 over the center sill.

As shown in Fig. 2, the floor doors B are pivoted along their inner edges as indicated at 19 to suitable hinge butts preferably attached to the center sill, or to the latter and the cross members of the underframe. Each of the doors B preferably consists of a plurality of longitudinally extending boards or planks secured together on the upper sides by a plurality of plates or straps, and braced on the underside by a pair of transversely extending beams 21. Each of the latter, at the outer free edge of the door, is downwardly deflected as indicated at 21^a and then extends outwardly horizontally as indicated at 21^b beyond the plane of the side wall 14, for the purposes hereinafter described.

Beneath each door, as shown in Fig. 2, I locate a longitudinally extending bar 22, preferably composed of wood on account of its yielding qualities to lessen the shocks when the door strikes it. Each of said bars 22 is supported at its ends by means of a U-shaped strap 23 shaped to snugly fit and receive the bar 22, the upper ends of the side arms of the strap being twisted at right angles to the bottom central portion, as indicated at 23^a—23^a, and the latter in turn being riveted or otherwise rigidly secured to the adjacent needle beam or cross member 11.

Preferably the bars 22 are provided with suitable hardened wear plates 24 on their upper sides in line with the door braces 21 so that wear on the bars is minimized and the shock is transmitted to the door through the braces 11. The stop arrangement which I have shown is more or less resilient, is efficient in operation, superior to the usual angled flange employed for a similar purpose, and the strap attachment permits of the doors being stopped at any desired point, it being evident that the straps are extended below the bottom edges of the cross members or diaphragms. It will also be noted that the straps are placed so as to extend at right angles to the plane of the door when the latter is in its opened position, thus placing the strap purely under tension and rendering it most efficient.

In order to eliminate the use of expensive shafts and the usual flexible door raising and lowering devices, I employ locking latches, two for each door, as shown in Fig. 1. The details of one of said latches,

which are arranged right and left so as to swing toward each other as clearly shown in Fig. 1, are best illustrated in Figs. 3, 4, 5 and 6. Each of said locking devices comprises, broadly, a bracket or support C; a lever latch D; and a locking cam E.

The bracket C, preferably a casting, is provided with a main back wall or web 30, which, when the bracket is in position, bears against and is secured to the side wall structure of the car as by a series of three rivets 31—31. To provide a housing and also to prevent outward bending or movement of the latch and locking cam, the bracket C is formed with an outer wall or web 32 united to the main wall or web 30 by flanges 33 and 34. The contour of the web or wall 32 is irregular and preferably of the outline shown best in Fig. 3. The latch and locking cam are housed between the walls or webs 30 and 32, the swinging movement of the lever latch D in a closing or operative direction being limited by said flange 33, as shown in Fig. 5. The swinging movement of the cam E to its inoperative position, is likewise limited by the same engaging the flange 34.

I have provided a novel and efficient means for pivotally supporting the latch and cam. In the back wall or web 30 of the bracket C are provided depressions or circular recesses 35 and 36, the back wall at these points being thickened to allow for said recesses 35 and 36 without weakening the casting. The recesses 35 and 36 accommodate the heads 37 of heavy pivot pins 38 and 39 for the latch and cam respectively, the shanks of said pins being extended horizontally outwardly through alined openings in said back wall 30 and outer wall 32 as clearly illustrated in Fig. 4. In this manner the pivot pins 38 and 39 are positively held against displacement after the locking device is in position, inasmuch as the heads of the pins are confined between the bracket and the adjacent fixed portions of the car structure. With this arrangement, the pins are stronger and less subject to bending and shear than if the same were extended entirely through the bracket into the side wall structure of the car. The latch lever D is formed with a shank having the upper portion thereof 40 sloping downwardly and from its pivotal support toward the opposite latch of the same set, the lower portion of the shank as indicated at 41 extending vertically when the latch is in operative position. At the bottom of the shank, is formed a bearing or locking face 42 which is curved on a relatively long radius about a center eccentric to the axis of the pivotal connection of the latch so that said curved bearing face 42 when it is pushed home against a corresponding curved bearing face 43 provided on the bottom of a block 44 secured to the outer end 21^b of the door brace, will have a wedging effect in pushing the door to fully closed position. It will also be noted that the shank of the latch is of right angular cross-section with a flange 45 extending in planes transverse to the car and the other or outer flange 45' extending parallel to the car and overlapping the end of the door brace and block 44 when in operative position.

The locking cam E is of the usual type having a cam surface adapted to engage with a flat surface 46 on the portion 40 of the shank of the latch lever.

As will be understood by those skilled in the art, the doors are adapted to be lifted by hand or by means of a suitable lever engaged with a socket or bracket on the underside of the door and lifted to closed position. As the doors approach their closed position the projecting ends 21^b engage the beveled lower ends 47 of the latch levers D thereby pushing the latter so as to clear the extensions 21^b until the latter are sufficiently elevated for the locking faces 42 of the latch levers to swing under the locking faces 43 under the influence of gravity.

With my arrangement of locking latches it is evident that the expense for the door operating means is very materially reduced as compared with prior arrangements, commonly employed on general service cars, and that this reduction of the expense in conjunction with the reduced cost of the doors and fittings, makes the entire car an extremely inexpensive one to manufacture.

I have herein shown and described what I now consider the preferred manner of carrying out the invention, but the same is merely illustrative and I contemplate all changes and modifications that come within the scope of the claims appended hereto.

I claim:

1. In a car, the combination with a pivoted dump door having a projection from one of its edges; of means for locking said door in closed position comprising, a bracket secured to a fixed part of the car, a shouldered latch engageable with said projection and a headed pin for pivotally supporting said latch from said bracket, said pin extending through the bracket and having its head confined between the inner face of the bracket and the adjacent portion of the car.

2. In a car, the combination with a pivoted dump door having a projection from one of its edges; of means for locking said door in closed position comprising, a bracket secured to a fixed part of the car, a shouldered latch engageable with said projection, said latch being pivoted to the bracket; a locking cam engageable with said latch to hold it in operative position, and a headed pin pivotally supporting said locking cam from said bracket, said pin extending through

bracket and having its head confined between the inner face of the bracket and the adjacent portion of the car.

3. In a car, the combination with a pivoted dump door having a projection from one of its edges; of means for locking said door in closed position comprising, a bracket secured to a fixed portion of the car, a shouldered latch engageable with said projection, a locking cam engageable with the latch, and headed pins for pivotally supporting the latch and locking cam, each pin extending through the bracket and having its head confined between the inner face of the bracket and the adjacent portion of the car.

4. In a car, the combination with a pivoted side dump floor door having extensions from its free edge extending outwardly beyond the side wall of the car; of means for holding said door in closed position, said means comprising brackets secured to the outer face of the car wall and shouldered latches pivotally attached to said brackets adapted to engage said projections, said latches having shanks of angular cross-section.

5. As an article of manufacture, a latch for pivoted doors, said latch comprising, a bracket having an inner wall and an outer wall spaced therefrom to form a housing, a shouldered lever pivotally supported from said bracket between said inner and outer walls thereof and depending below the bracket and adapted to fall to operative position under the influence of gravity, a locking cam cooperable with said lever to hold it in operative position, and bodily detachable pivot pins for said lever and locking cam, said pivot pins being provided with retaining means adapted to engage one side of the bracket and a portion of the surface to which the bracket is secured.

6. In a door device for railway cars, the combination with a hinged drop door having a hook-engaging seat formed thereupon, of a door-supporting hook pivoted upon the car body and arranged for supporting cooperation with the said seat, the said hook having a shank portion and a supporting ledge below the shank portion arranged for engagement with the said door seat, there being an integral shroud of metal connecting the said ledge with the said shank portion, the said shroud being arranged to one side of the said ledge.

7. In a door device for railway cars, the combination with a hinged drop door having a hook-engaging seat formed thereupon, of a door-supporting hook pivoted upon the car body and arranged for supporting cooperation with the said seat, the said hook having a shank portion and a supporting ledge below the shank portion arranged for engagement with the said door seat, there being an integral shroud of metal connecting the said ledge with the said shank portion, the said shroud being arranged to one side of the said ledge and outwardly of the said seat on the door.

8. A locking device for car doors embodying a base with inner and outer spaced walls comprising a housing, a hook pivotally mounted between said walls, an end wall connecting the said inner and outer walls, the said end wall extending around the top of the hook in an arcuate path.

9. A locking device for the drop doors of railway cars, embodying a bracket with integral inner and outer walls and an integral connecting wall, a hook pivoted between the inner and outer walls, the said connecting wall extending at an angle with the general line of the bracket and following the contour of the forward edge of the hook, and bracket-securing rivets extending through the said inner wall, the same being arranged along the said connecting wall.

10. A locking device for the drop doors of railway cars, embodying a bracket with a base portion, an outer wall integral with and spaced from the said base, an integral connecting wall, a hook pivoted between the base and the outer wall and lying along one side of the connecting wall, a dog pivoted to the bracket to the rear of the hook, and a plurality of rivets connecting the bracket to the car, the said rivets passing through the said base and some thereof being located along one side of the said connecting wall and the hook and others thereof being located to the other side of the said connecting wall and the hook.

In witness that I claim the foregoing I have hereunto subscribed my name this 24th day of June, 1922.

ARGYLE CAMPBELL.

Witnesses:
UNA C. GRIGSBY,
ANN BAKER.

March 23, 1926. 1,577,688

A. CAMPBELL

DUMP CAR

Filed Jan. 30, 1922 2 Sheets-Sheet 2

Fig. 6

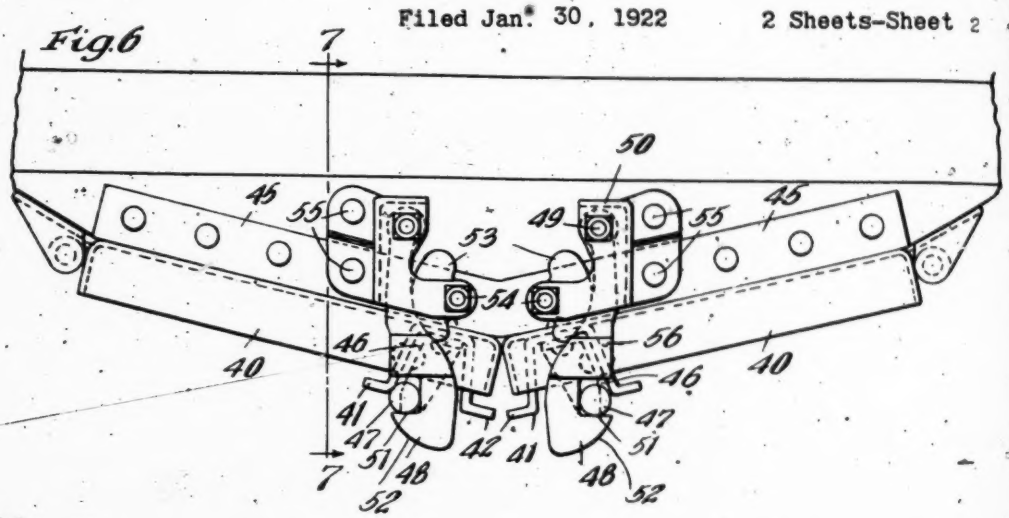


Fig. 7

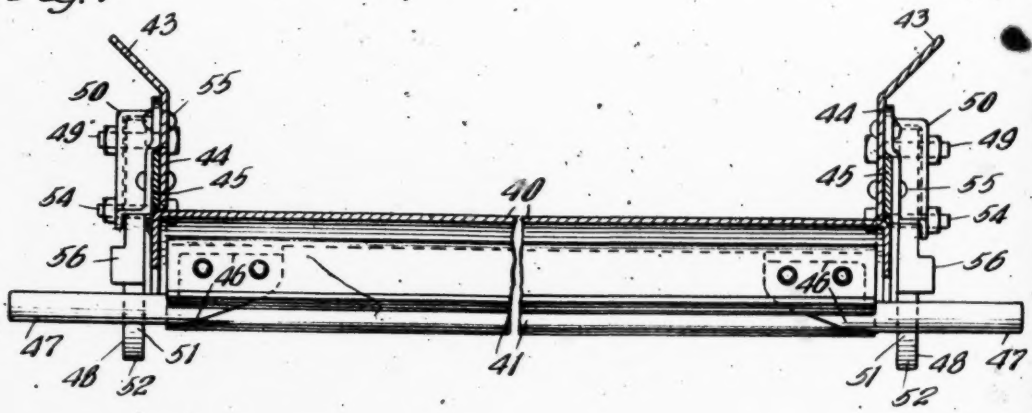


Fig. 4

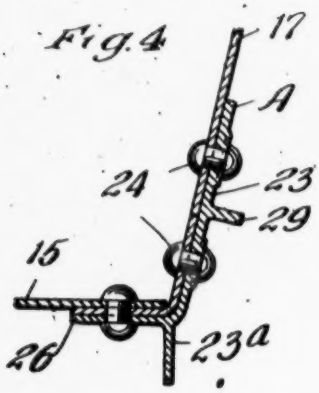
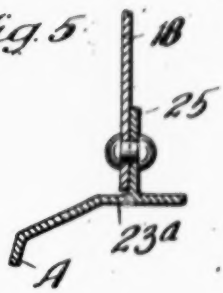


Fig. 5

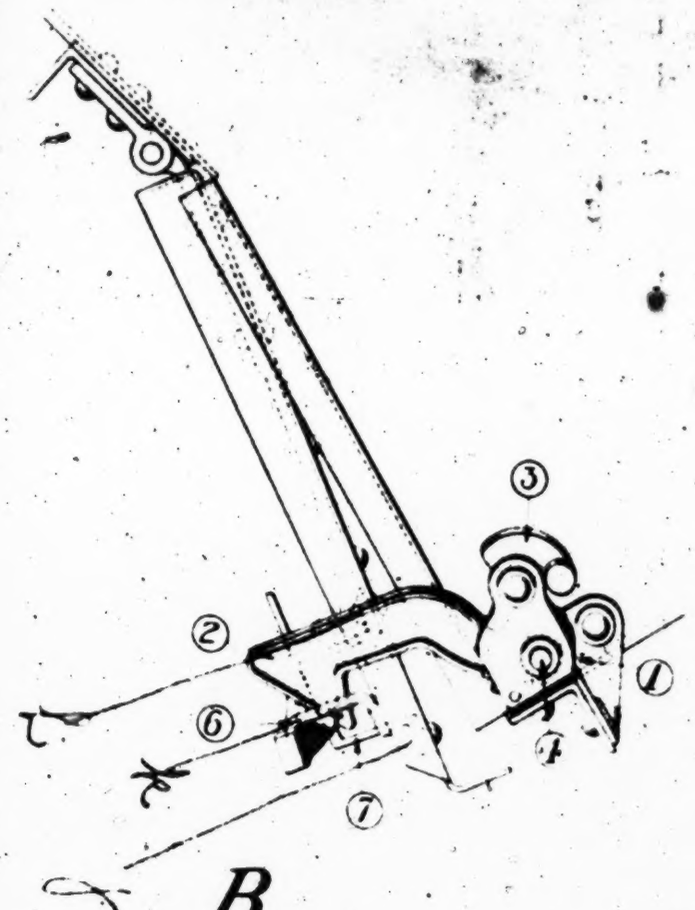


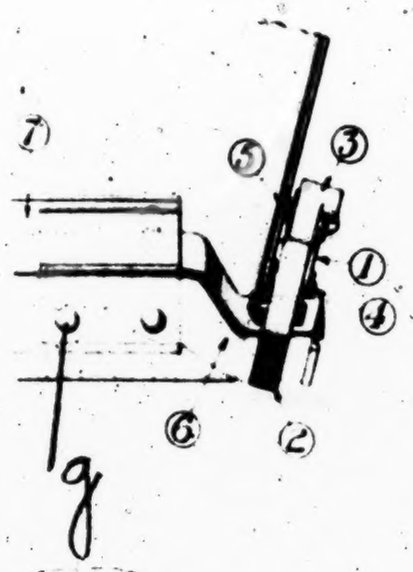
Inventor
Argyle Campbell

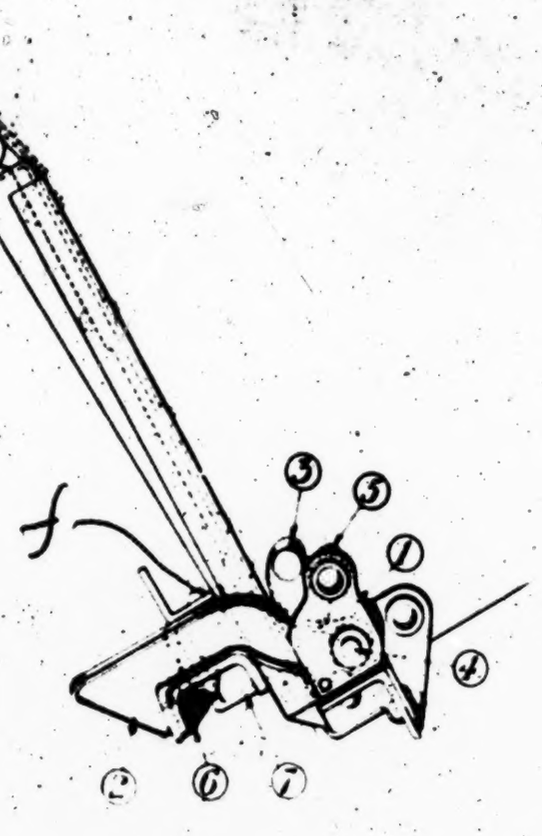
By Geo. I. Haight
His Atty

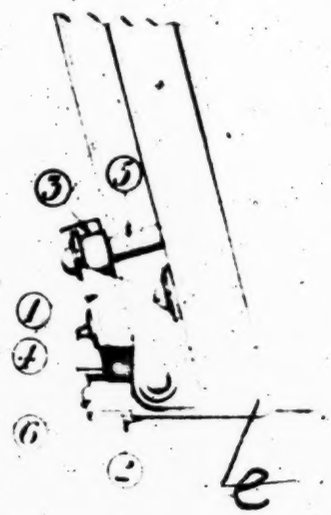
Enterprise No. 31
J. H. H Set n
4,431.

A
Assembly Sheet



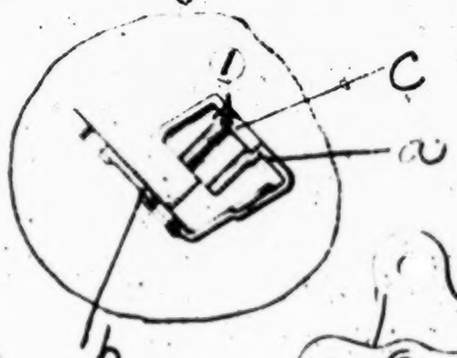


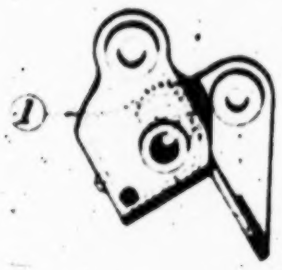


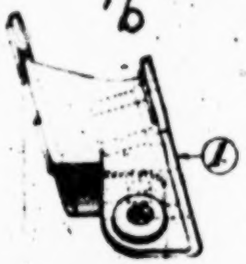


B
Detail Sheet

Bracket
1







Door Arm
6

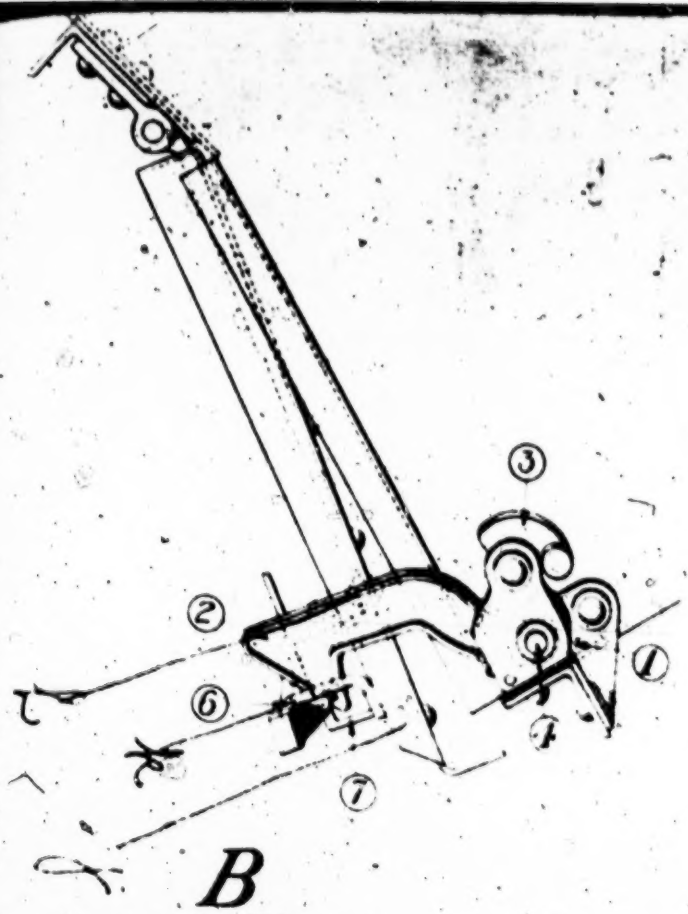
Door Spreader Section
7

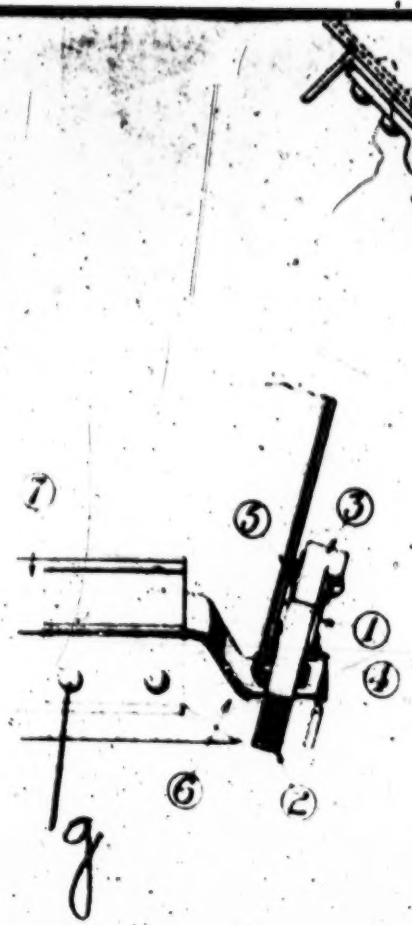
Door Hook
2

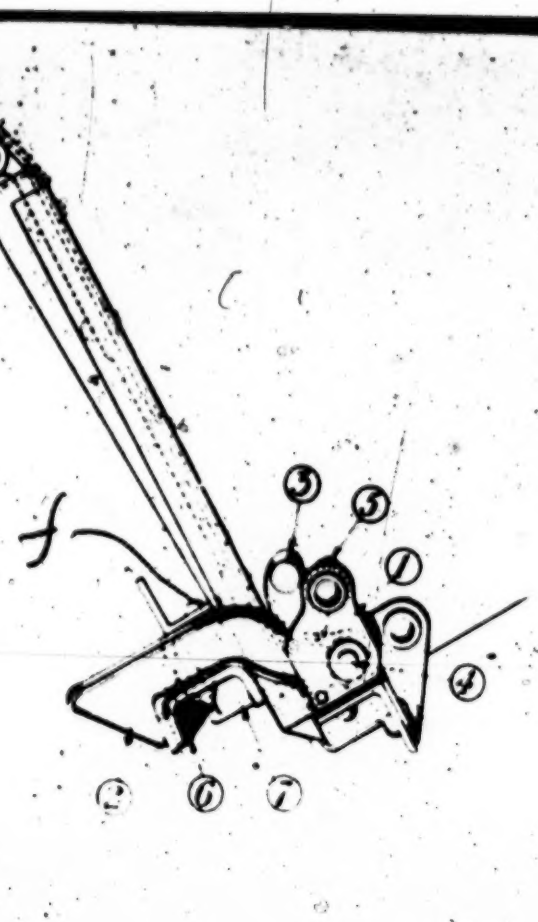
Cam Dog
3

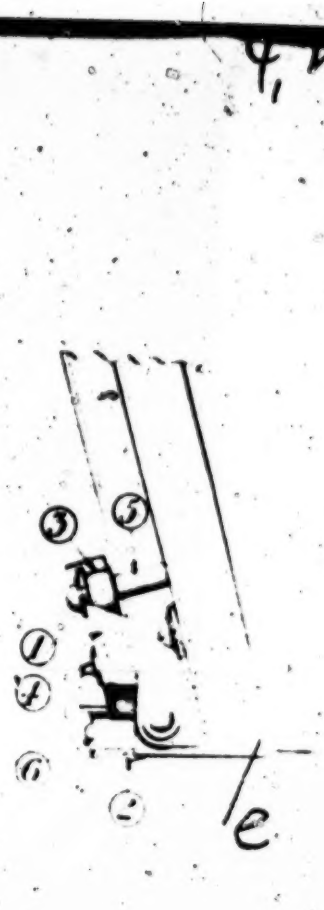
Spacing Thimble
5

Door Hook Pivot
4



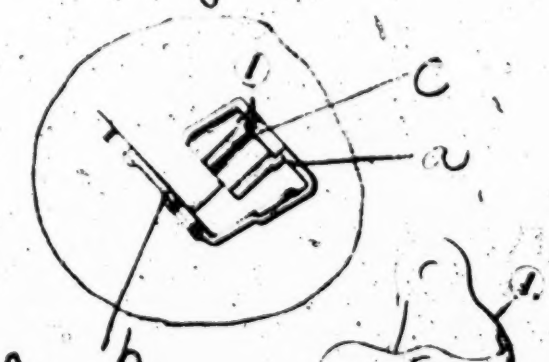




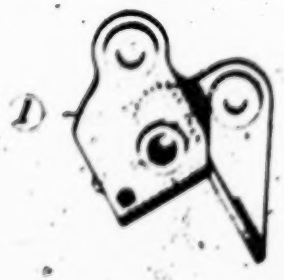


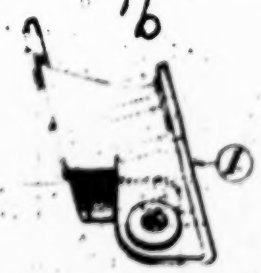
B

Detail Sheet



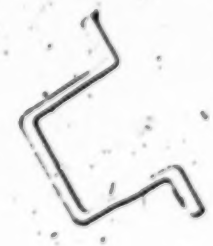
Bracket
1



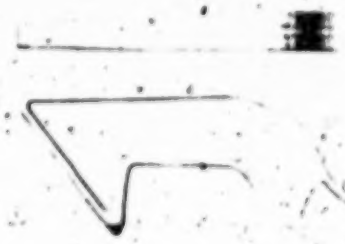


Door Arm

Door Sprender Section
7



Door Hook
2



Cam Dog

Spacing Thimble

Door Hook Pivot

March 23, 1926. 1,577,688

A. CAMPBELL

DUMP CAR

Filed Jan. 30, 1922 2 Sheets-Sheet 1

Fig. 1

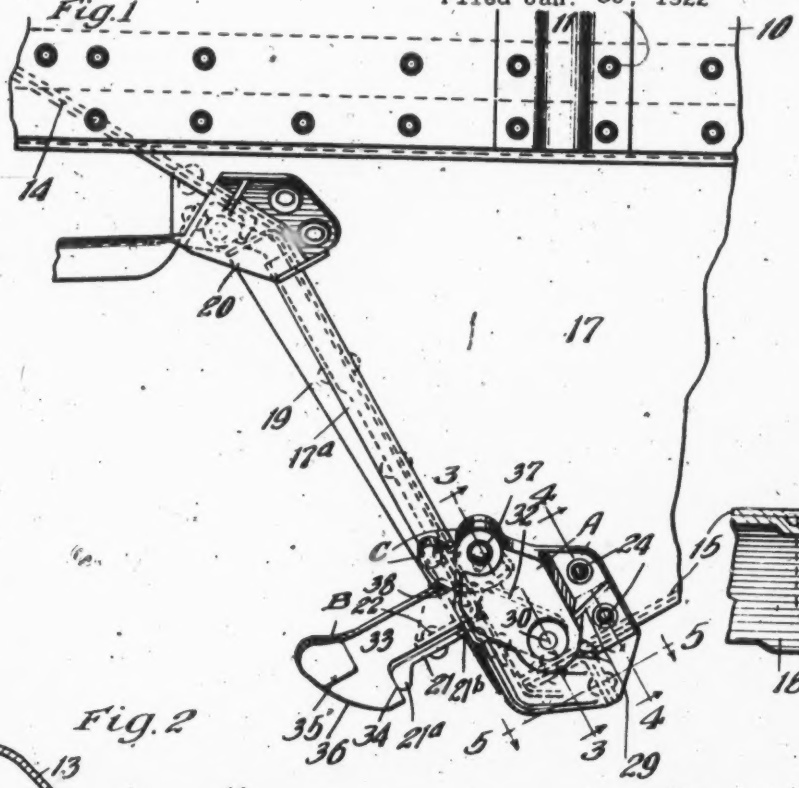


Fig. 3

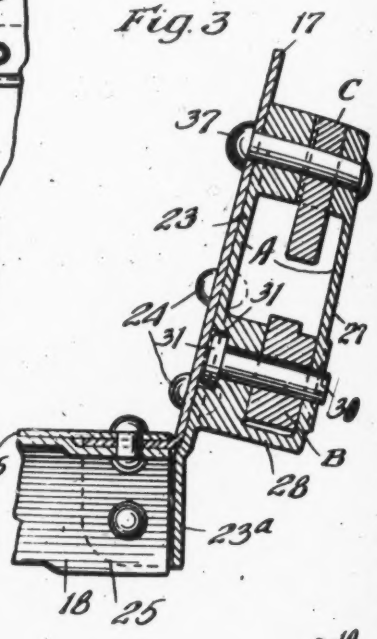
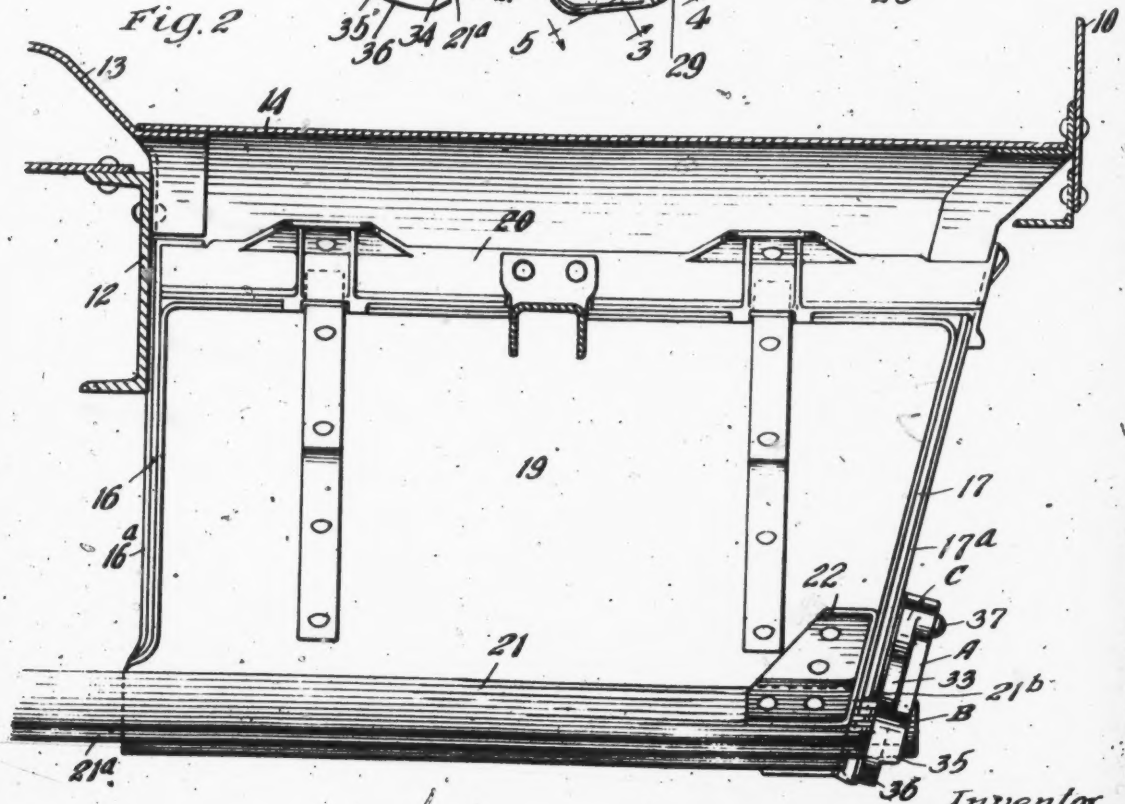


Fig. 2



Inventor
Argyle Campbell

By Geo. I. Haight
Atty.

ented Mar. 23, 1926. 1,577,688

UNITED STATES PATENT OFFICE.

ARGYLE CAMPBELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO ENTERPRISE RAILWAY EQUIPMENT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DUMP CAR.

Application filed January 30, 1922. Serial No. 532,733.

To all whom it may concern:

Be it known that I, ARGYLE CAMPBELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Dump Cars, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in dump cars.

One object of the invention is to provide in a dump car, efficient and relatively inexpensive means for locking the discharge doors in closed position.

A more specific object of the invention is the provision of a door locking arrangement having portions thereof utilized to strengthen certain parts of the car construction which have heretofore been especially liable to injury.

In the drawings forming a part of this specification, Figure 1 is a broken elevational view of a portion of a W-type hopper car showing my improvements in connection therewith. Figure 2 is a vertical, transverse, sectional view of the structure shown in Figure 1, taken at the left of the latter and looking toward the right, only half of the car structure transversely being shown. Figures 3, 4 and 5 are enlarged detail sectional views corresponding to the lines 3—3, 4—4 and 5—5 respectively of Figure 1. Figure 6 is a side elevational view of a twin door hopper car showing another embodiment of my improvements in connection therewith. And Figure 7 is a vertical transverse sectional view of the car shown in Figure 6 and corresponding to the section line 7—7 thereof.

Referring first to the construction illustrated in Figures 1 to 5, inclusive, 10 denotes one of the side walls of the car, 11 a side stake, 12 one of the center sills, 13 the longitudinally extending ridge sheet over the center sills, 14 the transversely extending ridge sheet between the sets of hoppers, 15 one of the hopper bottom sheets sloped downwardly from the end of the car toward the center, 16 an inner hopper side sheet, and 17 an outer hopper side sheet, the latter being sloped downwardly and inwardly toward the center line of the car. It will be understood by those skilled in the art, there are four hoppers similar to the one illustrated, two on each side of the center sill and arranged in pairs extending transversely of the car.

The hopper side sheets 16 and 17 are suitably flanged along their edges surrounding the discharge opening to provide the necessary strength as indicated at 16^a and 17^a respectively, and the lower edge of the bottom sheet 15 is reinforced by a transversely extending angle iron 18 secured on the under side thereof. Each hopper discharge opening is adapted to be closed by a sheet metal door as indicated at 19, the latter being hinged along their upper edges to swing about axes extending transversely of the car. In the arrangement shown, each door 19 is hinged to a combined hinge butt and floor sheet stiffener 20, similar to that more specifically described and claimed in my co-pending application Serial No. 521,292 filed December 10, 1921, now Patent No. 1,437,091, granted November 28, 1922. Secured to each transversely alined pair of doors 19, adjacent the free edges thereof and parallel thereto, is an angle iron 21 provided with an enlarged or bulb edge 21^a. The bulb angle iron 21 is secured to both transversely alined doors of a set so that the latter are operated in unison. In the corner defined by the bulb iron 21 and the outer side edge of the door, is a pressed plate 22 riveted to the door proper and the iron 21 so as to provide additional strength. Where the outstanding flange of the bulb iron 21 passes the flanged outer side edge of the door 19, said bulb angle iron is cut away as indicated at 21^b in Figure 1, it being understood that the bulb iron is extended an appreciable distance beyond the hopper side sheet 17 and the corresponding side edge of the door, to adapt it for cooperation with the latch, about to be described.

To hold the doors in closed position, I employ a latch at each end of the bulb iron 21, only one of the same, however, being shown in the drawing. This improved latch, as shown, comprises, broadly, a bracket A; a latch lever proper B; and a locking cam C.

The bracket A, preferably in the form of a casting, has an inner main web 23 lying against the sloping side sheet 17 and secured thereto as by the rivets 24—24. Said web 23 is extended downwardly below the

bottom sheet 15 of the hopper, as shown at 23ª in Figure 3 and overlaps the corresponding end of the angle iron 18. The bracket casting A is also provided with a transversely extending flange 25 parallel to and riveted to the outstanding flange of the angle iron 18. In addition, the bracket casting is formed with another flange 26 extending under, parallel to and riveted to the hopper bottom sheet 15. With this arrangement, it will be noted that the bracket casting A secured unites the hopper side sheet 17, the hopper bottom sheet 15 and the bracing angle 18, at the lower corner of the hopper, thereby preventing the hopper side sheet from tearing out or rusting out at this point, which has been a source of difficulty in cars of this type, heretofore.

The bracket casting A is provided also with an outer web 27 spaced from and parallel to the web 23, said web 27 being united to the web 23 by a flange 28 extending perpendicularly between the two webs 23 and 27, so that a housing is provided for the lever B and cam C. The flange 28 is reinforced at suitable intervals by ribs 29—29.

The latch lever B is pivotally attached to the bracket A by means of a pin 30 which extends through suitable openings in the back wall or web 23 and the web 27. Said pin 30 has a headed inner end which seats within a recess 31 in the back web so that the pin 30 will be held in operative position when the bracket A is secured to the hopper side sheet 17. The lever B swings in a plane parallel to the webs 23 and 27 and side sheet 17. Said lever is provided with a shank having one section 32 extending upwardly and away from the pivot pin 30 and another section 33 which extends parallel to the hopper bottom sheet 15, when the lever B is in operative position. At its outer end, the lever B is formed with a shoulder 34 adapted to engage and cooperate with the rounded bulb edge of the iron 21, said shoulder engaging the iron 21 at a point closely adjacent the side edge of the door and inwardly removed from the extreme outer end of said iron 21. Said lever B is provided also with an outwardly and laterally extended shoulder 35 so disposed that a bar or lever may be inserted between it and the extended end of the bulb iron 21 so as to facilitate prying the lever B upwardly to release the doors. The outer end of the lever B is rounded or beveled as indicated at 36 so as to act as a guide to lift the lever B when the doors are moved to closed position, said edges 36 being engaged by the bulb angle 21, as will be understood, the levers dropping into operative position under gravity when the bulb iron has passed beyond the shoulders 34.

The locking cam C is pivotally supported between the inner and outer webs of the bracket A on a through rivet 37 which only acts as a pivot for the locking cam but also assists in securing the bracket to hopper sheet. Said cam C is of well known form and engages with a rounded edge 38 formed in the lever B on the upper side approximately where the two sections 32 and 33 of the shank merge.

In the arrangement shown in Figures 6 and 7, transversely extending twin doors 40—40 are employed, pivoted to swing about transversely extending axes. The free edges of the pair of doors meet, and extending along the under side of each door near its free edge and parallel thereto, is a bracing beam 41 of substantially inverted U shape with the sides laterally flanged as indicated at 42—42. The sides of the hopper are sloped inwardly for a distance as indicated at 43 in Figure 7 and thence extended vertically downward as indicated at 44. Suitable reinforcing plates 45 are secured to the lower edges of the vertical portions 44.

To hold the doors in closed position, I employ the following arrangement. At each end of the brace 41 and within it is secured a forging or casting 46, the latter having an outwardly extending integral heavy pin or bar 47 of circular cross section. The pins or bars 47 are extended outwardly beyond the side edges of the door and also beyond the latching device, hereinafter described, so that the outer extended ends of said bars 47 may be used as handles in elevating the doors to closed position.

Cooperable with each of the extended pins 47 is a hook-shaped latch or lever 48 which is pivotally supported at its upper end by a bolt 49 which is housed within a bracket casting 50 secured to the vertical portion 44 of the hopper side sheet. Said lever 48 has a shoulder 51 adapted to engage under the rounded pin or bar 47 and hold the door as will be obvious. The lower edge of the lever 48 is rounded as indicated at 52 so that in lifting the door to closed position, the levers 48 will be cammed to one side until such time as the pins 47 have moved high enough to allow the shoulders of the latch levers to drop thereunder under the influence of gravity. Each lever also has an outwardly or laterally projecting pry-off lug 56.

Cooperable with each latch lever 48 is a locking cam 53 also pivotally supported from the housing bracket 50 by means of a bolt 54. The bolts 49 and 54 are extended through the side sheets so as to form part of the attaching means for the latch, there being additional rivets 55, as shown in Figure 6, to secure the housing bracket.

I claim:

1. In a car provided with a hopper defined by side and bottom hopper sheets, an outer side hopper sheet forming a corner with the bottom sheet at the discharge op

ing, and a pivoted door to close said opening: the combination with a bracket having integral portions thereof secured to said bottom and side wall sheets at the intersecting corner; of a latch movably mounted on said bracket, said latch being adapted to cooperate with a member rigid with the door to lock the latter in closed position.

2. In a hopper dump car having a hopper defined by a sloping bottom wall and side walls, and a pivoted door to close the hopper opening, the combination with a member rigid with the door and projecting from one end thereof appreciably beyond the adjacent fixed side wall of the hopper; of a latch operatively supported from said side wall of the hopper and having a shoulder adapted to engage said projecting portion of said member between the end of the latter and the edge of the door, said latch being provided with a laterally extended shoulder with which a suitable operating tool is adapted to be used to effect disengagement of the latch.

3. In a dump car having a pivoted discharge door, the combination with a member rigidly secured to said door and having a rounded-off portion projecting appreciably beyond an edge of the door and beyond the adjacent fixed wall of the car; of a shouldered latch pivotally attached to said wall of the car and projecting across said edge of the door and adapted to engage and cooperate with said rounded-off projecting portion of said member at a point between the end of the latter and the edge of the door, said latch being provided with a laterally extended shoulder for use in disengaging the latch from said member.

4. In a car provided with a hopper having side and bottom walls meeting and forming a corner adjacent the discharge opening, and a pivoted door to close said opening: the combination with a member rigid with and projecting from the door; of a bracket having portions thereof secured to said bottom and side walls; and a latch pivoted to said bracket, said latch cooperating with said projecting member from the door.

5. In a car, the combination with a pivoted door having a projection from one of its edges; of means for locking said door in closed position comprising: a bracket secured to a fixed portion of the car, a latch engageable with said projection; a locking cam engageable with the latch; a headed pin for pivotally supporting the latch on the bracket, said pin extending through the bracket and having its head confined between the inner face of the bracket and the adjacent portion of the car, the aforesaid cam being pivotally supported on a pivot extending through the bracket and a fixed portion of the car.

6. In a car provided with a hopper having a downwardly sloping bottom wall and a side wall sloping from the vertical inwardly toward the center of the car, and a door for closing the discharge opening, said door being arranged to swing about an axis parallel to the plane of said bottom wall: the combination with a member rigidly secured to said door and projecting beyond one side edge thereof; of a bracket secured to said side wall and having a portion thereof extending under and secured to the bottom wall; and a latch pivotally mounted on said bracket to swing in a plane parallel to said inclined side wall, said latch having a shoulder adapted to engage and cooperate with said projecting member from the door.

7. In a hopper car having a pair of transversely alined hopper doors: the combination with a bulb angle iron secured to said doors and rigidly uniting the latter, said bulb angle iron extending parallel and adjacent to the free edges of the doors; of pivoted shouldered latches mounted on fixed portions of the car, cooperable with the bulb edge of said angle iron to hold the doors in closed position.

8. In a car having a hopper defined by a bottom wall, inner and outer side walls, and a pivotally mounted door to close the discharge opening of the hopper: the combination with a reinforcing angle iron secured to the under side of the bottom wall along the lower edge thereof; of a bracket secured to one of the side walls of the hopper and extending over the end of said angle iron, said bracket having also portions extending under the bottom wall and secured to the latter and to the angle iron; a shouldered latch pivotally mounted on said bracket; and a member rigidly mounted on the door projecting therefrom with which said latch is adapted to cooperate in holding the door in closed position.

9. In a car, the combination with a pivoted dump door having a projection from one of its edges; of means for locking said door in closed position comprising: a bracket secured to a fixed part of the car and having inner and outer walls spaced from each other and connected by transverse walls; a latch engageable with the projection on the door, said latch being pivotally supported on the bracket by means of a headed pin extending through the inner and outer walls of the bracket, said pin having its head confined between the inner face of the bracket and the adjacent portion of the car; a locking cam engageable with said latch to hold it in operative position; and a pivot for pivotally retaining said locking cam, said pivot extending through the outer wall of the bracket and a fixed portion of the car.

10. In a dump car having a hopper defined by a sloping wall and side walls, and a pivoted door to close the hopper opening, the combination with a member on the door,

and projecting from one end thereof appreciably beyond the adjacent fixed side walls of the hopper; of a shouldered member supported from said side wall of the hopper and having a shoulder adapted to engage said projecting portion of said member between the end of the latter and the edge of the door, said shouldered member being provided with a laterally extended shoulder with which a suitable operating tool is adapted to be used to effect disengagement of the member on the door from the shouldered member.

11. In a dump car, the combination with a dump door; of a beam formed of a rolled section projecting beyond an edge of the door, said beam having the web thereof normal to the plane of the door and having outstanding marginal portions, one of said marginal portions being secured to the door; and a shouldered latch mounted on a fixed portion of the car adapted to engage with the other of said outstanding marginal portions of the beam.

12. In a dump car, the combination with a dumping door having a flange at the edge thereof; of a beam member secured to the door and having a portion projecting beyond the plane of the flange, said beam having a web lying normal to the plane of the door and outstanding portions defining the margins of said beam, said beam being secured to the door by securing means passing through one of the said outstanding marginal portions; and a pivotally mounted shouldered door member adapted to engage with the other of said outstanding portions to lock the door in closed position, said beam being formed with a cutaway portion to clear the flange of the door.

In witness that I claim the foregoing I have hereunto subscribed my name this 7th day of January, 1922.

ARGYLE CAMPBELL.

33

ENTERPRISE EXHIBIT 33

Campbell Patent, 1,615,794

Issued to A. Campbell January 25, 1927

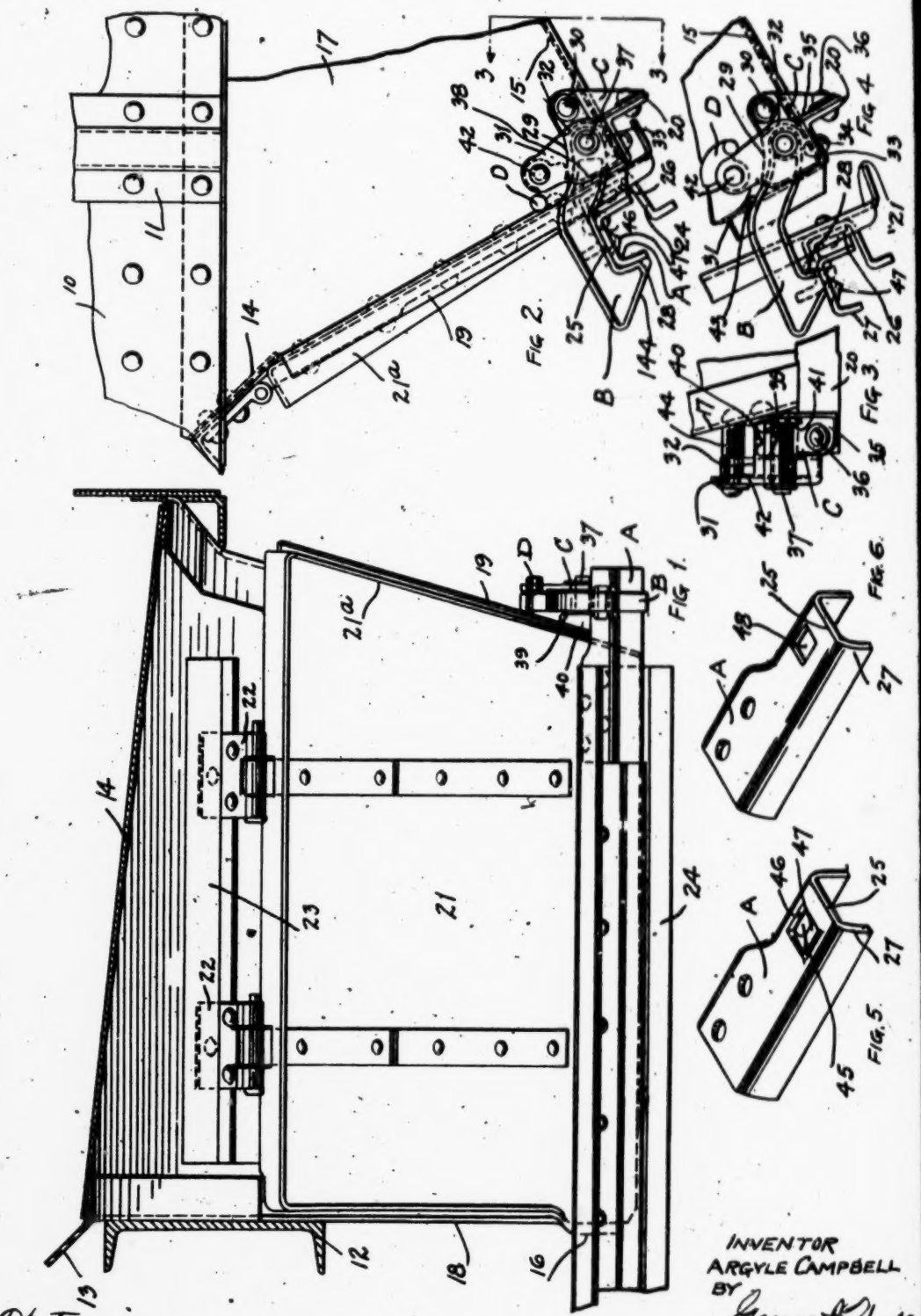
152

Jan. 25, 1927. 1,615,794

A. CAMPBELL

DUMP CAR

Filed Jan. 25, 1923



Witness:
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Patented Jan. 25, 1927. 1,615,794

UNITED STATES PATENT OFFICE.

ARGYLE CAMPBELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO ENTERPRISE RAILWAY EQUIPMENT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DUMP CAR.

Application filed January 25, 1923. Serial No. 614,797.

This invention relates to improvements in dump cars.

One object of the invention is to provide in a dump car, efficient and relatively inexpensive means for retaining the discharge door in a partially closed position and thereafter supporting and locking the same in closed position.

A specific object of the invention is the provision of a door locking arrangement having portions thereof utilized to strengthen certain parts of the car construction which have heretofore been liable to injury.

In the drawings forming a part of this specification Fig. 1 is a vertical, transverse, sectional view taken through a portion of a W-type hopper car illustrating my improvements in connection therewith. Fig. 2 is a side elevational view of a portion of the same car showing the discharge door in fully closed locked position. Fig. 3 is a view taken on a line corresponding substantially to line 3—3 of Fig. 2. Fig. 4 is a fragmentary side elevational view of the car illustrating the discharge door in partially closed position. Fig. 5 is a perspective view of the door brace extension. Fig. 6 is a perspective view of a modified form of door brace extension.

Referring to the drawing, 10 denotes one of the side walls of the car, 11 a side stake, 12 one of the center sills, 13 the longitudinally extending ridge sheet over the center sills, 14 the transversely extending ridge sheet between the sets of hoppers, 15 one of the hopper bottom sheets sloped downwardly from the end of the car toward the center, 16 an inner hopper side sheet, and 17 an outer hopper side sheet, the latter being sloped downwardly and inwardly towards the center line of the car. As will be understood by those skilled in the art, there are four hoppers similar to the one illustrated, two on each side of the center sill and arranged in pairs extending transversely of the car.

The hopper side sheets 16 and 17 are suitably flanged along their edges surrounding the discharge opening to provide the necessary strength as indicated at 18 and 19 respectively, and the lower edge of the bottom [illegible] is reinforced by a transversely ex-

thereof. Each hopper discharge opening is adapted to be closed by a sheet metal door as indicated at 21, the latter being hinged along their upper edges to swing about axes extending transversely of the car and reinforced at the side edges by flanges 21^a. In the arrangement shown, each door 21 is hinged to brackets 22 which are riveted to the transversely extending ridge sheet 14 which is there reinforced by means of angle 23.

Secured to each transversely alined pair of doors 21, adjacent the free edges thereof and parallel thereto, is a beam 24. The beam 24 is secured to the transversely alined doors of a set so that the latter are operated in unison. Secured to each end of the beam 24 is a flanged extension A, each preferably formed of a plate pressed in the form of a channel and of reduced depth as it passes under the flanges 21^a of the door 21. Each said extension A has the web 25 thereof secured to the beam 24 and one of the flanges 26 secured to the door by means of rivets passing through the beam 24 and door plate 21. The opposite flange 27 is curved, preferably on a radius, the center of which coincides with the pivotal axis of a latch B, hereinafter described, the latter having a correspondingly curved shoulder 28 whereby, when the door is in closed position, the latch will securely hold the same. The latch B is pivoted to a bracket C which is secured to the car body and with the latch co-operates a cam D, as hereinafter specifically described.

Said bracket C rests upon and fits against the angle 20 which is extended outwardly beyond the hopper side walls 17, thus providing ledges on which the brackets rest, it being understood that I employ a latch at each side of the car, only one side however being shown in the drawing. The bracket C, preferably in the form of a casting, has an inner wall 29 lying against the sloping side sheet 17 and secured thereto by means of a rivet 30. The bracket casting C is also provided with an outer wall 31 disposed in a substantially vertical plane and spaced a short distance from the inner wall 29, said inner and outer walls being connected with a transversely extending wall 32 of arcuate shape and a wall 33 parallel

Patented Jan. 25, 1927.

UNITED STATES PATENT OFFICE.

ARGYLE CAMPBELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO ENTERPRISE RAILWAY EQUIPMENT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DUMP CAR.

Application filed January 25, 1923. Serial No. 614,797.

This invention relates to improvements in dump cars.

One object of the invention is to provide in a dump car, efficient and relatively inexpensive means for retaining the discharge door in a partially closed position and thereafter supporting and locking the same in closed position.

A specific object of the invention is the provision of a door locking arrangement having portions thereof utilized to strengthen certain parts of the car construction which have heretofore been liable to injury.

In the drawings forming a part of this specification Fig. 1 is a vertical, transverse, sectional view taken through a portion of a W-type hopper car illustrating my improvements in connection therewith. Fig. 2 is a side elevational view of a portion of the same car showing the discharge door in fully closed locked position. Fig. 3 is a view taken on a line corresponding substantially to line 3—3 of Fig. 2. Fig. 4 is a fragmentary side elevational view of the car illustrating the discharge door in partially closed position. Fig. 5 is a perspective view of the door brace extension. Fig. 6 is a perspective view of a modified form of door brace extension.

Referring to the drawing, 10 denotes one of the side walls of the car, 11 a side stake, 12 one of the center sills, 13 the longitudinally extending ridge sheet over the center sills, 14 the transversely extending ridge sheet between the sets of hoppers, 15 one of the hopper bottom sheets sloped downwardly from the end of the car toward the center, 16 an inner hopper side sheet, and 17 an outer hopper side sheet, the latter being sloped downwardly and inwardly towards the center line of the car. As will be understood by those skilled in the art, there are four hoppers similar to the one illustrated, two on each side of the center sill and arranged in pairs extending transversely of the car.

The hopper side sheets 16 and 17 are suitably flanged along their edges surrounding the discharge opening to provide the necessary strength as indicated at 18 and 19 respectively, and the lower edge of the bottom sheet 15 is reinforced by a transversely extending angle 20 secured to the underside thereof. Each hopper discharge opening is adapted to be closed by a sheet metal door as indicated at 21, the latter being hinged along their upper edges to swing about axes extending transversely of the car and reinforced at the side edges by flanges 21^a. In the arrangement shown, each door 21 is hinged to brackets 22 which are riveted to the transversely extending ridge sheet 14 which is there reinforced by means of angle 23.

Secured to each transversely alined pair of doors 21, adjacent the free edges thereof and parallel thereto, is a beam 24. The beam 24 is secured to the transversely alined doors of a set so that the latter are operated in unison. Secured to each end of the beam 24 is a flanged extension A, each preferably formed of a plate pressed in the form of a channel and of reduced depth as it passes under the flanges 21^a of the door 21. Each said extension A has the web 25 thereof secured to the beam 24 and one of the flanges 26 secured to the door by means of rivets passing through the beam 24 and door plate 21. The opposite flange 27 is curved, preferably on a radius, the center of which coincides with the pivotal axis of a latch B, hereinafter described, the latter having a correspondingly curved shoulder 28 whereby, when the door is in closed position, the latch will securely hold the same. The latch B is pivoted to a bracket C which is secured to the car body and with the latch co-operates a cam D, as hereinafter specifically described.

Said bracket C rests upon and fits against the angle 20 which is extended outwardly beyond the hopper side walls 17, thus providing ledges on which the brackets rest, it being understood that I employ a latch at each side of the car, only one side however being shown in the drawing. The bracket C, preferably in the form of a casting, has an inner wall 29 lying against the sloping side sheet 17 and secured thereto by means of a rivet 30. The bracket casting C is also provided with an outer wall 31 disposed in a substantially vertical plane and spaced a short distance from the inner wall 29, said inner and outer walls being connected with a transversely extending wall 32 of arcuate shape and a wall 33 parallel with and secured to the outstanding flange

of the angle iron 20 by means of a rivet 34. In addition, the bracket is formed with a flange 35 extending downwardly and secured to the depending flange of the angle iron 20 by means of a rivet 36.

The latch member B is pivotally mounted on the bracket casting by means of pivot 37 and lateral outward movement of the said latch member is restrained by means of a flange 38 formed on the outer wall and inward lateral movement by means of a web 39 formed on the end of a boss 40 extending outwardly from the inner wall 29. Said boss 40 is recessed at 41 to accommodate the head of the pin 37 which is inserted therein before the casting C is placed on the car. With this arrangement, it will be observed that the casting C securely unites the hopper side sheet 17, the hopper bottom sheet 15 and the bracing angle 20, at the lower corner of the hopper, thereby preventing the hopper side sheet from tearing out or rusting out at this point, which has been a source of difficulty in cars of this type heretofore.

The locking cam D is pivotally supported between the outer wall 31 of the bracket C and the sloping hopper side wall 17 on a rivet or pin 42, which not only acts as a pivot for the cam D but also assists in securing the bracket C to the hopper sheet. Said cam D is of well known form and engages with a curved surface 43 formed on the latch member B. A ferrule 44 preferably formed of a section of commercial pipe is interposed between the sloping hopper side sheet 17 and the cam D, thereby maintaining the latter in alignment with the latch B.

The outer end of the latch B is beveled as indicated at 144 so as to act as a guide to lift the said latch when the doors are moved to closed position, said edge 144 being engaged by the flanged extension A, as will be understood, the latch dropping into locking position under gravity when the curved flange 27 on the extension A has passed beyond the locking face 28 of the latch B.

It is sometimes desirable to close the doors in a series of operations and in order to maintain the door in a partly closed position, I have provided in the web 25 of the extension A, a recess 45 within which the end of the latch B may drop and temporarily maintain the door in a nearby closed position. In its preferred form the locking face 28 of the latch B is caused to engage the edge 46 of the perforation formed in the web 25 of the extension A. The relative position then assumed by the parts with the door partially closed is clearly indicated in Fig. 5 where the beveled end of the latch is shown as extending within the recess 45. Said recess is preferably formed by punching a relatively narrow slot in the plate and thereafter depressing the metal adjacent thereto in a downward direction as indicated at 47.

I have shown in Fig. 6 a modified construction wherein the recess in the web for the purpose of receiving the latch is formed by punching a rectangular shaped hole therein as indicated at 48.

What I claim is:

1. In a car provided with a hopper having side and bottom walls meeting and forming a corner adjacent the discharge opening, and a pivoted door to close said opening; the combination with a member secured to the door and projecting therefrom; of a stiffening member secured to the aforesaid bottom wall and projecting outwardly beyond the side wall; a bracket supported on the said projecting portion of the stiffening member; and a latch pivoted to said bracket, said latch co-operating with said projecting member from the door.

2. In a car provided with a hopper having side and bottom walls meeting and forming a corner adjacent the discharge opening, and a pivoted door to close said opening; the combination with a member secured to the door and projecting therefrom; of a rigidifying member secured to the aforesaid bottom wall and projecting outwardly beyond the side wall; a bracket having portions thereof secured to the aforesaid side wall and to the said rigidifying member; and a latch pivoted to the said bracket, said latch co-operating with said projecting member from the door.

3. In a car provided with a hopper having a downwardly sloping bottom wall and a side wall sloping inwardly from the vertical and forming with said bottom wall one of the corners of the discharge opening, and a pivoted door to close said opening; the combination with a member secured to the door and projecting from one edge of the door across the edge of said side wall; of a rigidifying member secured to the aforesaid bottom wall and projecting outwardly beyond the side wall; a bracket secured to said projecting portion of the rigidifying member and having a wall lying in the plane of the inclined wall and secured thereto; and a latch pivoted to said bracket, said latch co-operating with said projecting member from the door.

4. In a car provided with a hopper having a downwardly sloping bottom wall and a side wall meeting and forming a corner adjacent the discharge opening, and a pivoted door to close said opening; the combination with a member secured to the door and projecting therefrom; of a reinforcing angle iron secured to the underside of the bottom wall along the outer edge thereof and projecting outwardly from the side wall of the said hopper; a bracket secured to the side wall of the hopper and having portions se-

cured to both flanges of the angle iron; and a latch pivotally mounted on said bracket, said latch being adapted to co-operate with said projecting member on the door for maintaining the door in closed position.

5. In a car provided with a hopper having a downwardly sloping bottom wall and a side wall meeting and forming a corner adjacent the discharge opening, and a pivoted door to close said opening; the combination with a member secured to the door and projecting therefrom; of a reinforcing member projecting outwardly beyond the side wall and secured to the underside of the sloping bottom wall along the lower edge thereof: a bracket carried by the said projecting portion of the reinforcing member and having inner and outer walls spaced from each other, the inner wall lying against the hopper side wall and secured thereto and the outer wall being disposed in a plane substantially at right angles to the axis of the door, transverse walls connecting the said inner and outer walls, one of said transverse walls being secured to the reinforcing member; means co-operating with said projecting member on the door and comprising a latch pivotally mounted on the aforesaid bracket and a headed pin for pivotally supporting said latch on said bracket, said pin extending through the bracket and having its head confined in a recess formed in the inner wall of the bracket; and a cam co-operable with said latch to hold it in operative position, said cam being pivotally mounted on a pivot extending between the outer wall of the bracket and the hopper side wall.

6. In a car, the combination with a pivoted dump door having a projection from one of its edges; of means for locking said door in closed position comprising; a bracket secured to a fixed part of the car body and having inner and outer walls spaced from each other; a latch engageable with the projection on the door, said latch being pivotally supported on the bracket by means of a headed pin extending through the inner and outer walls of the bracket, said pin having its head confined between the inner face of the bracket and the adjacent portion of the car; a locking cam engageable with said latch to hold it in operative position; a pivot for pivotally mounting said locking cam, said pivot being supported at one end by the outer wall of the bracket and at the other end by a fixed portion of the car body; and a ferrule encircling the pivot and disposed adjacent the cam to space the same from the car body.

7. In a car provided with a hopper having a downwardly sloping bottom wall and a side wall sloping inwardly from the vertical and forming with said bottom wall, one of the corners of the discharge opening, and a pivoted door to close said opening; the combination with a projection from the side edge of the door across the edge of said side wall; of a bracket carried by the car structure and having inner and outer walls, the inner wall lying in the plane of the car side wall and inclined relatively to the outer wall, transverse walls connecting the inner and outer walls and a boss extending outwardly from the inner wall; a latch pivotally mounted between the end of the said boss and the outer wall and co-operating with the extension on the door; a headed pin extending through the said boss and outer wall of the bracket with the head thereof confined between the inner face of the bracket and the sloping side wall of the car; a rivet connecting the said outer wall with the sloping side wall of the car; a cam pivotally mounted on the said rivet; and spacing means carried by the rivet spacing the cam from the side wall of the car.

8. In a dump car having a pivoted discharge door, the combination with a reinforcing member secured to the underside of the door adjacent the free edge thereof; of an extension piece secured thereto and extending outwardly beyond one of the side edges thereof, said extension being formed of a plate bent substantially to a channel shape with one of the flanges thereof slightly curved; and a latch pivoted on the car body, said latch having a shoulder with a face which is curved to engage said curved flange of the extension.

9. In a dump car having a pivoted discharge door, the combination with a member secured to the underside of the door and projecting beyond one of the side edges thereof, said projecting portion of the member being approximately channel cross section with one of the flanges thereof slightly curved; of a latch pivoted to the car body, said latch having a face curved to engage said curved flange of the member.

10. In a dump car having a pivoted discharge door, the combination with a member secured to the underside of the door and projecting beyond one of the side edges thereof, said projecting portion of the member being of approximately channel cross section; of a latch pivoted to the car body and adapted to engage one of the flanges of the member to maintain the door in closed position; and a perforation formed in the web of the said channel shaped member intermediate the door surface and the aforesaid flange, said perforation being adapted to receive the latch, thereby permitting the latter to engage the web of the member and temporarily retain the door in a partly closed position.

11. In a dump car having a discharge door, the combination with a member secured to the door; of a door locking member pivoted on the car body adapted to supportingly en-

gage the door and maintain the same in a partly closed position and also in a fully closed position, said member on the door having a web with a perforation therein adapted to receive the locking member in such a manner that the outer edge of the perforation constitutes a supporting ledge for the door in the partly open position.

12. In a dump car having a pivoted discharge door, the combination with a flanged member secured to the underside of the door and projecting beyond one of the edges thereof; of a latch pivoted to the car body and adapted to engage one of the flanges of the member to retain the door in a closed position; and an indentation formed in the web of the said flanged member adapted to be engaged by the latch for retention of the discharge door in a partly closed position.

13. In a dump car having a pivoted discharge door, the combination with a beam member secured to the underside of the door and projecting beyond one of the edges thereof; of a latch pivoted to the car body and adapted to engage the beam member to retain the door in closed position, said beam member having a web portion with a latch engaging abutment formed therein to temporarily support the door in partly closed position.

14. In a dump car having a pivoted discharge door, the combination with a beam member secured to the door; of a latch pivoted to the car body and adapted to engage the aforesaid beam member at a point intermediate the depth thereof, the engaging portion on the beam member being one edge of a perforation in the web of the beam member, the metal of the plate, opposite said edge, being depressed from the main plane of the plate.

In witness that I claim the foregoing I have hereunto subscribed my name this 25th day of January, 1923.

ARGYLE CAMPBELL.

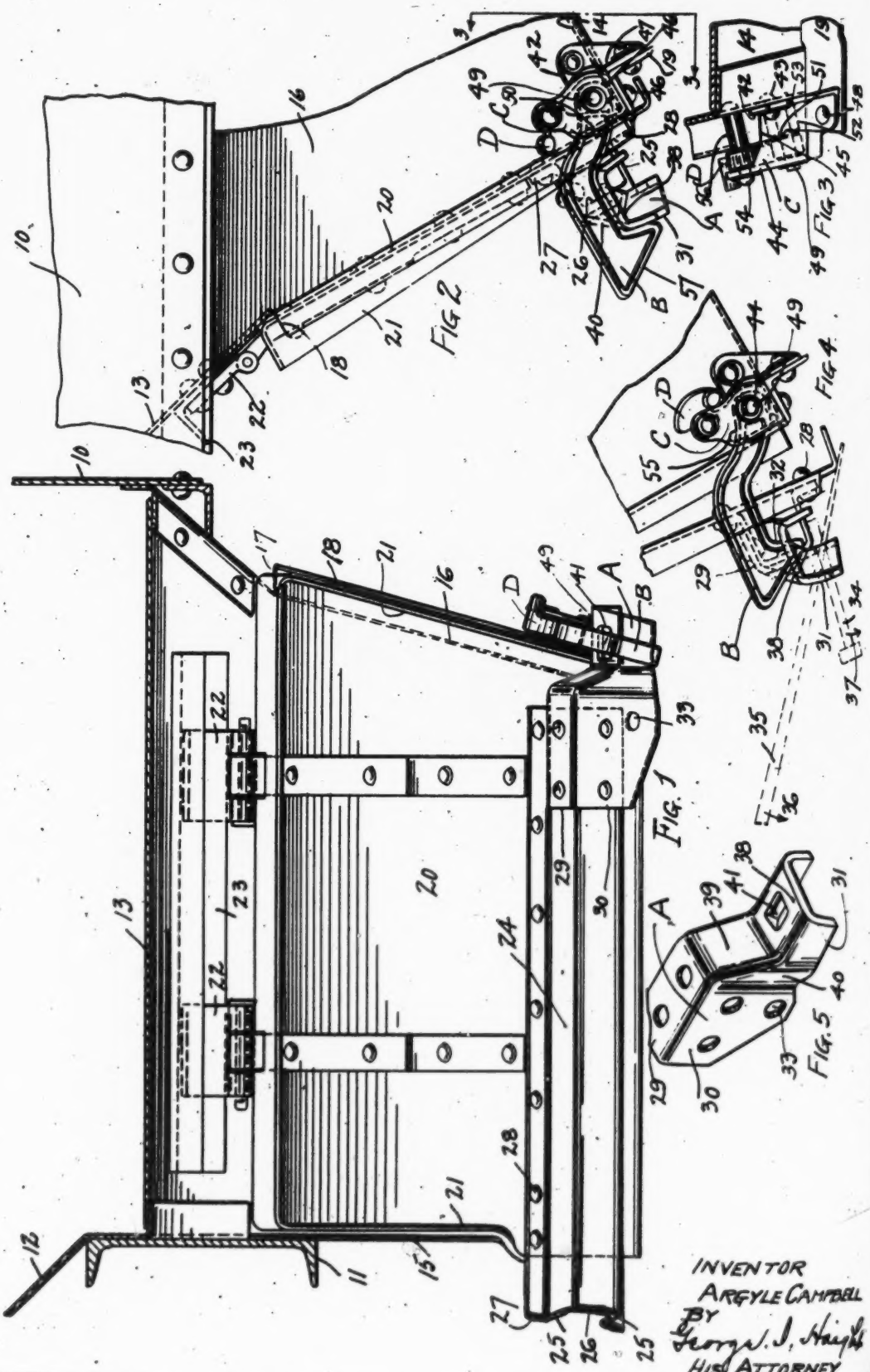
ENTERPRISE EXHIBIT 34
Campbell Patent 1,615,795
Issued to A. Campbell January 25, 1927

Jan. 25, 1927. 1,615,795

A. CAMPBELL

DUMP CAR

Filed March 12, 1923 2 Sheets-Sheet 1



Jan. 25, 1927. 1,615,795

A. CAMPBELL

DUMP CAR

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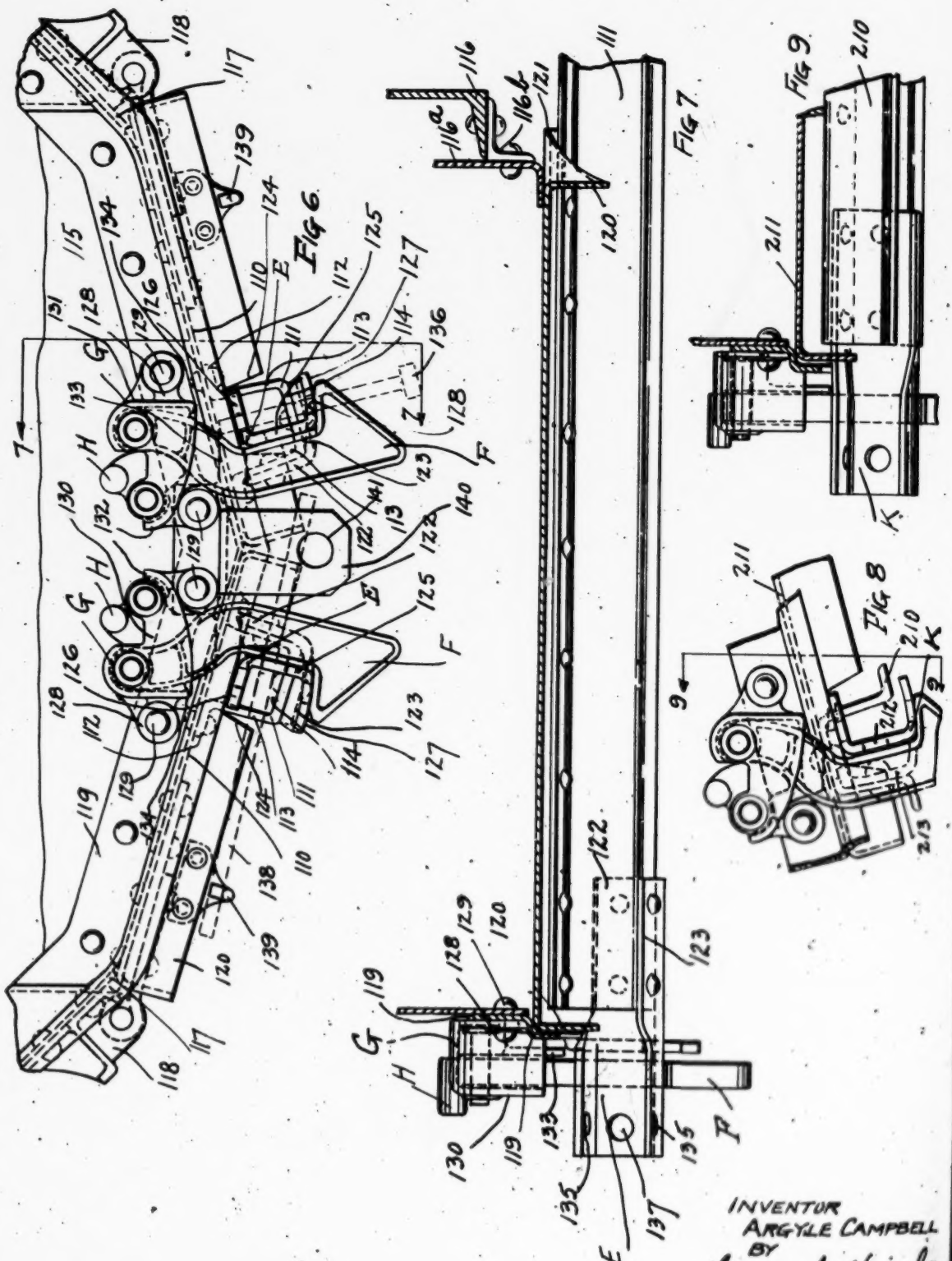

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Patented Jan. 25, 1927. 1,615,795

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DUMP CAR.

Application filed March 12, 1923. Serial No. 624,405.

This invention relates to improvements in dump cars.

An object of the invention is to provide, in a dump car, an improved door construction to be used in connection with "Ingoldsby" type of door supporting latches.

A specific object of the invention is the provision of an improved door beam extension adapted to be engaged by a locking latch pivotally mounted on the body of the car.

The invention further resides in certain novelties of construction and arrangement of parts such as will be more particularly pointed out in this specification.

In the drawings forming a part of this specification, Figure 1 is a vertical, transverse, sectional view taken through a portion of a W type hopper car illustrating my improvements in connection therewith. Fig. 2 is a side elevational view of a portion of the car, illustrated in Fig. 1, showing the discharge doors in fully closed position. Fig. 3 is a view taken on a line corresponding substantially to line 3—3 of Fig. 2. Fig. 4 is a fragmentary, side elevational view, of the car, illustrating the discharge door in partially closed position. Fig. 5 is a perspective view of the door beam extension. Fig. 6 is a side elevational view of a twin hopper car showing another embodiment of my improvement in connection therewith. Fig. 7 is a vertical, transverse, sectional view, corresponding substantially to the section line 7—7 of Fig. 6. Fig. 8 is a fragmentary view of a discharge door and latch of the type illustrated in Fig. 6 showing a further modified form of construction. And Fig. 9 is a transverse, vertical, sectional view, corresponding substantially to the section line 9—9 of Fig. 8.

Referring first to the construction illustrated in Figures 1 to 5, inclusive, 10 denotes one of the side walls of the car; 11 one of the center sills; 12 the longitudinally extending ridge sheet over the center sills; 13 the transversely extending ridge sheet between the sets of hoppers; 14 one of the hopper bottom sheets sloped downwardly from the end of the car towards the center; 15 an inner hopper side sheet, and 16 an outer hopper side sheet, the latter being sloped downwardly and inwardly towards the center line of the car. As will be understood by those skilled in the art, there are four hoppers similar to the one illustrated, two on each side of the center sill, and arranged in pairs extending transversely of the car.

Each hopper side sheet 16 is suitably flanged along the edge adjacent the discharge opening, as indicated at 17 and 18, to provide the necessary strength, and the lower edge of the bottom sheet 14 is reinforced by a transversely extending angle iron 19 secured to the underside thereof. Each hopper discharge opening is adapted to be closed by a sheet metal door, 20. The doors 20 are hinged along their upper edges to swing about axes extending transversely of the car, and each door is reinforced at the top and side edges by flanges 21. In the arrangement shown, each door 20 is hinged to brackets 22, which are riveted to the transversely extending ridge sheet 13, which is reinforced by means of angle 23.

Secured to each transversely alined pair of doors 20, adjacent the free edges thereof and parallel thereto, is a connecting beam 24, commercially known as a "door-spreader" section. The beam 24 is preferably in the form of a rolled channel shape member, comprising a pair of webs 25—25 united by means of a central portion 26, and a pair of flanges 27—27 projecting outwardly from the extremities of the webs, the central portion 26 and the flanges 27 being formed of a greater thickness of metal than the web portions 25. The spreader is secured to the door 20 by means of rivets 28 passing through the flanges 27 and through the door plate.

Secured to the opposite ends of the beam 24 are flanged extensions A, each preferably in the form of a plate pressed into shape to permit the same to be secured to the beam in two different planes. The extension may be formed, as best shown in Figures 1, 4 and 5, with flanges 29 and 30, at right angles to each other, the flange 29 being secured to one of the web portions 25 of the beam and flange 30 being secured to the central portion 26 thereof. The outer end of said extension A is off-set and projects outwardly beneath the flange 21 of the door, presenting an overhanging portion, which is preferably of channel shape, with the outer flange 31 thereof slightly curved. The flange 31 is preferably curved on a radius corresponding to the radius of a curved shoulder 32 formed on a latch B, pivotally mounted on the car structure and adapted to supportingly en-

gage the aforesaid extension A to securely hold the door in closed position.

The latch B is pivoted on a bracket C which is secured to the car body, and a cam D cooperates with the latch B, as hereinafter specifically described.

Heretofore it has been customary to dispose the extension on the beam member to one side of the center of gravity thereof, whereby the main line of force which passes through the latch pivot and the door exerts a turning movement on the beam, tending to twist the beam on its axis. The tendency to twist the beam is further accentuated by the operation of swinging the door to closed position, it being customary to provide the extension with a perforation as indicated at 33 adapted to receive a bolt 34 or a bar 35, by means of which the door is operated, the bolt or bar being passed through the opening and depressed in the directions indicated by the arrows 36 and 37 respectively, swinging the door to closed position.

These defects are remedied in the construction herein shown, by deflecting the web 38 of the extension A from one side of the beam to a position centrally thereof. This is accomplished by forming an offset 39 in the web of the extension, said offset extending at an angle between the flange 29 and web 38 of the channel shaped portion of the extension A. The curved flange 31, constituting the latch engaging seat, is spaced from the outer surface of the door a greater distance than the flange 30, in order to provide for proper clearance for the flange 31 as the same passes under the flanged portion 21 of the door, wall 40 connecting the flanges 30 and 31 extending at an angle between the same. A perforation 41 is provided in the web 38 within which the latch may drop to retain the door in a nearly closed position, as shown in Fig. 4.

The brackets C rest upon and fit against the angle irons 19, the latter being extended outwardly beyond the sloping side walls 16 of the hopper, thus providing supporting ledges for the brackets, it being understood that I employ a bracket and latch at each side of the car, only one side, however, being shown in the drawing. Each bracket C is preferably in the form of a casting, having an inner wall 42 lying against the sloping side sheet 16, and is secured to the latter by means of a rivet 43. The bracket casting C is also provided with an outer wall 44 disposed in a plane substantially parallel to the sloping hopper side wall 16 and is spaced a short distance therefrom. The inner and outer walls 42 and 44 are connected by a transversely extending wall 45, and a wall 46 parallel with and secured to the outstanding flange of the angle iron, 19, by means of a rivet 46. In addition the bracket is formed with a downwardly extending flange 47 secured to the depending flange of the angle iron 19 by means of a rivet 48.

The latch member B is pivotally mounted on the bracket casting C by means of a pivot 49, and is adapted to swing in a plane substantially parallel with the slope of the car side. Lateral outward movement of the said latch member is prevented by means of a flange 50 formed on the outer wall 44 of the casting C, and inward lateral movement thereof is prevented by means of the face 51 constituting the end wall of a boss 52 extending outwardly from the inner wall 42 of said casting. The boss 52 is recessed as indicated at 53 to accommodate the head of the pivot pin 49, which is inserted therein before the casting C is placed on the car. With this arrangement, it will be evident that the casting C securely unites the hopper bottom sheet 14 and the bracing angle iron 19 with the hopper side wall, at the lower corner of the hopper, thereby preventing the hopper side sheet from tearing out at this point.

The locking cam D is pivotally supported between the outer wall 44 of the bracket C and the sloping hopper side wall 16 on a rivet or pin 54, which not only acts as a pivot for the cam D but also serves to secure the bracket C to the hopper sheet. The cam D is of well known form, and engages with a curved surface 55 formed on the latch member B. A ferrule 56, preferably formed of a section of commercial pipe, is interposed between the sloping hopper side wall 16 and the cam D, thereby maintaining the latter in alignment with the latch B.

The outer end of the latch B is beveled as indicated at 57 so as to act as a guide to lift the latch when the doors are moved to closed position, said beveled end 57 being engaged by the extension A, as will be evident, the latch dropping into locking position under gravity, when the curved flange 31 on the extension A has passed beyond the locking face 32 of the latch B.

In the embodiment of the invention shown in Figs. 6 and 7, transversely extending twin doors 110—110 are employed, pivoted to swing about transversely extending axes. The free edges of the pair of doors meet, and extending along the underside of each door, near its free edge, and parallel thereto, is the bracing beam 111 of substantially U-shape cross section comprising flanges 112 extending outwardly from the upper extremities of a pair of webs 113, and a horizontally extending section 114 connecting the lower extremities of the webs. In Figs. 6 and 7 of the drawing, 115 denotes one of the outer side walls of the car; 116 one of the center sills; 116* the longitudinally extending inner walls of one of the hoppers; 116* a bracket connecting the inner wall with the center sill 116

117 the transversely extending ridge sheets; 118 the door hinge butts; and 119 outwardly and downwardly bent reinforcing plates secured to the outer side walls of the car. As will be understood by those skilled in the art, only one-half of the car is shown in Figs. 6 and 7, there being another similar hopper with a discharge door therefor on the other side of the center sill, the beam 111 extending from one door to the other. Each of the doors 110 has the edges thereof reinforced by down-turned flanges 120, each of said flanges adjacent the center sill being formed upwardly and merging with a flat portion, as indicated at 121, substantially in line with, or in the same plane as the body or main portion of the door, to clear the beam 111 extending from one door to the other.

To hold the doors in closed position, there is provided at each end of the beam 111 an extension E with which is adapted to cooperate a latch F. The extension E is in the form of a metal plate of angular cross section, including a pair of flanges 122 and 123 by which it is secured to the beam 111. The extension E projects outwardly beyond the flange 120 of the door, the flange being cut away as indicated at 124 to permit of said extension projecting therethrough. The overhanging portion of the extension is preferably of channel form, comprising a web 125, an upper flange 126 and a lower flange 127, the latter being curved to correspond substantially with the curvature of the shoulder 128 formed on the latch F.

The latch F is pivotally mounted in the bracket G and is adapted to be locked thereto by means of the locking cam H.

The bracket G, preferably in the form of a casting, is provided with a main backwall or web 128, which, when the bracket is in position, bears against and is secured to the side wall structure of the car by a series of rivets 129—129. To provide a housing and also to prevent outward movement and bending of the latch and locking cam, the bracket G is formed with an outer wall or web 130, united to the main wall or web 128 by means of transverse flanges 131 and 132.

The latch F, and locking cam H, are housed between the outer wall or web 128 and an intermediate wall 133 which extends from the transverse flange 131 to the transverse flange 132, and is spaced from the retaining wall 128 a sufficient distance to properly space the latch from the side wall of the car to clear projecting portions of the car structure. Said intermediate wall 133 is extended a distance downwardly below the transverse flanges 131 and 132 for the purpose of preventing inward bending of the latch F. Swinging movement of the latch F in a closing or operative direction is limited by a transverse flange 134 projecting from the transverse flange 131. The swinging movement of the cam H to its inoperative position, is likewise limited by the same engaging the transverse flange 132.

As it is customary to swing the door to closed position by direct application of the forces to the extensions E, great stability is required for these extensions both in regard to the strength of the same and in the method of their attachment to the beams. It is the usual practice to provide the door extensions F with which the latches engage, with perforations to receive an instrument by which the doors are swung to close position. One manner of accomplishing this result is to provide the extensions E which project outwardly beyond the latch levers with perforations 135 through which a bar or bolt 136 may be inserted in the manner shown in Fig. 6 for the purpose of swinging the doors to closed position. Another manner of accomplishing this result is to provide the web of the extension E with a perforation 137 through which a bar 138 is passed, with the free end thereof engaging an abutment 139 which may be formed on the door itself or on a portion of the car structure. The operation of levering the doors to closed position obviously creates a turning movement on the extensions and on the beams, which together with the strain imposed thereon due to the load from the doors tends to distort and loosen the parts, and therefore, a rigid construction, such as that shown herein, is of great importance.

With the form of latch lever illustrated herewith it is comparatively an easy matter to swing the doors on one side of the car to a closed position, but it frequently happens that the closing of the door on the other side calls for some means of levering the doors to closed position, due to the same having become warped or distorted. To accomplish this result, a fulcrum plate 140 is centrally disposed between the doors of each pair, the plate 140 being provided with a perforation 141 through which a bar may be inserted for the purpose of levering the doors to a position which will enable the latch levers to swing into position under the extensions E.

In Figs. 8 and 9 is illustrated a construction in all respects similar to that shown in Figs. 6 and 7, with the exception that the reinforcing beam 210 is secured to the door 211 by means of a connecting portion formed integral with the extension K and extending between the webs of the beam and that the extension K is of channel shape throughout the length thereof. The extension K is secured to the beam 210 and the door by means of the upper flange thereof, and is further secured to the beam through the web 213. The extension is offset in a similar manner and for a purpose similar to that described in connection with Figs. 1 to 7 inclusive, the web portion 212 being disposed substantially

in alignment with the center of the beam 210.

I have herein shown and described what I now consider the preferred manner of carrying out the invention, but the same is merely illustrative and I contemplate all changes and modifications that come within the scope of the claims appended hereto.

I claim:

1. In a car provided with a hopper having a downwardly sloping bottom wall and a side wall sloping inwardly from the vertical and forming with said bottom wall, one of the corners of the discharge opening, and a pivoted door to close said opening; the combination with a member secured to the door and projecting from one edge of the door across the edge of said side wall; of a rigidifying member secured to the aforesaid bottom wall and projecting outwardly beyond the side wall; a bracket secured to said projecting portion of the rigidifying member and having a wall lying substantially in the plane of the inclined side wall and secured thereto; and a latch pivoted to the said bracket, said latch co-operating with said projecting member from the door and lying in a plane substantially parallel with the slope of the car side, the inclined wall of said bracket overlying said latch member and constituting a guide therefor in its movements.

2. In a car provided with a hopper having a downwardly sloping bottom wall and a side wall sloping inwardly from the vertical and forming with said bottom wall, one of the corners of the discharge opening, and a pivoted door to close said opening; the combination with a projection extending from the side edge of the door across the edge of said side wall; of a bracket carried by the car structure and having inner and outer walls lying substantially in planes parallel to the sloping side wall of the hopper; transverse walls connecting the inner and outer walls and a boss extending outwardly from the inner wall; a latch pivotally mounted between the end of the said boss and the outer wall and co-operating with the extension on the door; and a cam engageable with the said latch to hold it in operative position, said cam being pivotally supported on a rivet connecting the aforesaid outer wall and the car structure.

3. In a dump car having a pivoted discharge door, the combination with a reinforcing member secured to the underside of the door adjacent the free edge thereof and having one face thereof disposed in a plane at substantially right angles to the plane of the door; of an extension piece secured to said member and extending outwardly beyond one of the side edges thereof; and a latch pivotally mounted on the car body adapted to engage the extension, the end of said extension being offset with reference to the reinforcing member to bring the latch shank engaging portion centrally of the reinforcing member in a plane substantially parallel to said face, whereby the shank of the latch is adapted to swing inwardly beyond the boundaries of said member.

4. In a dump car having a dumping door, the combination with a U-shaped member including a pair of webs, a connecting section between the webs, and flanges extending outwardly from the extremities of the webs, said flanges being secured to the door; of a flanged extension secured respectively to one of the webs and also to the connecting section between the webs; and a latch pivotally mounted on the car body and adapted to engage the said extension.

5. In a dump car having a dumping door, the combination with a U-shaped member, including a pair of webs, and a connecting section, said member being secured to the door by means of flanges extending outwardly from the extremities of the webs thereof; of an extension secured to the member; and a latch pivotally mounted on the car body and adapted to engage the said extension, said extension being attached to one of the webs of the U-shaped member and having the latch engaging portion thereof deflected inwardly with reference to said member to dispose the main line of force between the latch and the door intermediate the webs of the U-shaped member.

6. In a dump car having a dumping door, the combination with a U-shaped member, including a pair of connected webs, said member being secured to the door by means of flanges extending outwardly from the free ends of said webs; of an extension having a flange secured on the outer side of one of said webs; and a latch pivotally mounted on the car body and adapted to engage the said extension, the said extension having the latch engaging portion deflected inwardly to dispose said flange centrally of the said U-shaped member.

7. In a dump car having a dumping door, the combination with a beam member of U-shaped cross-section, comprising a pair of webs, a connecting section between the webs and flanges extending outwardly from the extremities of the webs whereby the member is secured to the door; of an extension piece provided with a pair of flanges, said flanges being secured respectively to one of the webs and to the connecting section between the webs, a portion of said flange connected to the web extending outwardly and disposed in a plane between said webs; and a latch pivotally mounted on the car adapted to engage with said extended portion of the flange.

8. In a dump car having a dumping door, the combination with a main reinfor-

member secured to the door adjacent the free edge thereof; of an extension secured thereto and projecting outwardly beyond an edge thereof, said extension having angular portions; and supporting means pivoted to the car body adapted to engage one of said angular portions to hold the door in closed position, said last named angular portion being depressed with respect to the main beam, and another of said angular portions facing said supporting means.

9. In a dump car having a dumping door, the combination with a reinforcing member secured to the door substantially parallel to adjacent the free edge thereof, and having a latch engaging portion projecting beyond the side edge of the door, of a latch pivotally mounted on the car body and adapted to engage the aforesaid projecting portion, the said latch engaging portion of the beam being offset from the main body of the beam in a plane substantially at right angles to the plane of the door.

10. In a dump car having a dumping door, the combination with a channel shaped reinforcing member secured to the door adjacent the free edge thereof; of an extension piece secured to the said reinforcing member; and a latch pivotally mounted on the car body adapted to engage the said extension, the said extension having a web disposed substantially at right angles to the plane of the door and secured to the reinforcing member to one side of the center thereof, said extension being offset to dispose the latch engaging portion of the web centrally of the reinforcing member.

11. In a dump car having a discharge door, the combination with a member secured to the door, of an extension secured to said member and projecting beyond one of the side edges thereof, said projecting portion being deflected in a plane substantially parallel to the plane of said door and also in a plane substantially normal to said door; and a latch pivotally mounted on the car adapted to engage the said projecting portion of the extension.

12. In a dump car having a pivoted discharge door, the combination with a reinforcing member secured to the underside of the door, adjacent the free edge thereof and including a portion of extended width disposed substantially in parallelism with said door; of an extension secured to said member and projecting outwardly beyond one of the side edges thereof, said extension being provided with latch engaging faces angularly disposed with reference to each other, said faces respectively limiting the movement of the latch in a locking direction and engaging the latch to hold the door in locked position, one of said faces being located midway between the extended boundaries of said substantially parallel portion; and a latch pivotally mounted on the car body and adapted to engage said latch engaging faces of said extension.

13. In a dump car, the combination with a pivoted discharge door; of a reinforcing member secured to the under side of the door and provided with a portion of extended width disposed substantially parallel with the plane of said door; said member being provided with an extension having a latch engaging portion; and a latch pivotally mounted on the car body and adapted to engage said latch engaging portion, the coacting engaging faces of said latch and extension being so arranged that the engaging portions of the latch are adapted to lie midway between the extended boundaries of the substantially parallel portion of said reinforcing member, when the latch is in locking engagement with said extension.

14. In a dump car, having a pivoted discharge door, the combination with a U-shaped reinforcing member secured to the under side of the door adjacent the free edge thereof, said member including spaced webs disposed at right angles to the plane of the door; of an extension piece secured to the said member and extending outwardly beyond one of the side edges thereof; and a latch pivotally mounted on the car body adapted to engage said extension, the aforesaid extension having a web portion disposed between said first named webs, in spaced relation and substantially parallel thereto.

15. In a dump car having a pivoted discharge door, the combination with a reinforcing member on the outer side of said door extending parallel to the free edge thereof, said reinforcing member including two webs in spaced planes extending substantially normal to the main plane of the door, said reinforcing member having an extension projecting beyond a side edge of the door and said projection including a web also extending substantially normal to the main plane of the door and substantially midway between said first mentioned spaced planes; and means, mounted on an adjacent fixed portion of the car cooperable with said extension to hold the door in closed position, said means and extension engaging in such manner that the load is transmitted in lines substantially coinciding with the plane of said extension web.

16. In a dump car having a dumping door, the combination with a reinforcing member secured to the door substantially parallel to and adjacent the free edge thereof, and having a latch engaging portion projecting beyond the side edge of the door; of a latch pivotally mounted on the car body and adapted to engage the aforesaid projecting portion, the said latch engaging portion of said member being offset from the main body of the member in a plane substantially

at right angles to the door, there being means on said latch engaging portion for engagement with said latch to retain the door in nearly closed position.

17. In a dump car having a dumping door, the combination with a reinforcing member secured to the door adjacent the free edge thereof; of an extension piece secured to the said reinforcing member; and a latch pivotally mounted on the car body adapted to engage the said extension, the said extension having a web disposed substantially at right angles to the plane of the door and secured to the reinforcing member to one side of the center thereof, said extension being offset to dispose the latch engaging portion of the web centrally of the reinforcing member, there being means on said extension for engagement with said latch to retain the door in nearly closed position.

18. In a dump car having a discharge door; the combination with a member secured to the door; of an extension secured to said member and projecting beyond one of the side edges thereof, said projecting portion being deflected downwardly and to one side; and a latch pivotally mounted on the car adapted to engage the said projecting portion of the extension, there being means on said latch engaging extension for engagement with said latch to retain the door in nearly closed position.

In witness that I claim the foregoing I have hereunto subscribed my name this 6th day of March 1923.

ARGYLE CAMPBELL.

PLAINTIFF'S EXCEPTIONS TO REPORT OF SPECIAL MASTER

(Filed June 29, 1932)

Now comes the plaintiff and cross-defendant, Enterprise Railway Equipment Company, and excepts to the report of J. W. Wilson, Special Master, filed herein on June 17, 1932, and in particular to the following findings of fact and conclusions of law contained in said report:

(1) The Master erred in failing to find and report that the accounting period in this case begins with the filing of the counter-claim on April 25, 1923.

(2) The Master erred in failing to find and report that Section 4900 of the Revised Statutes limits the accounting to a period beginning April 25, 1923, on which day the counter-claim of the defendant was filed.

(3) The Master erred in finding and reporting that the plaintiff's profits begin November 7, 1922, the date of issue of the patent in suit, and amount to $18,002.83.

(4) The Master erred in failing to find and report that the item of federal income tax of $1,415.11 on the account beginning November 7, 1922, should be deducted as an expense.

(5) The Master erred in failing to find and report that the item of federal income tax of $983.30 on the account beginning April 25, 1923, should be deducted as an expense.

(6) The Master erred in failing to allow, find and report an overhead expense of 33⅓% for the plaintiff.

(7) The Master erred in failing to allow, find and report, any overhead expense for the plaintiff.

(8) The Master erred in failing to find and report that the plaintiff is entitled to an apportionment of profits because of its contributions to the infringing structure and its installation.

(9) The Master erred in failing to find and report that the defendant, because of its failure to apportion profits, is entitled to nominal damages only.

(10) The Master erred in finding and reporting that this accounting is governed by the "Confusion Rule."

(11) The Master erred in finding and reporting that the entire marketability of the infringing structure was dependent on the double step feature.

(12) The Master erred in finding and reporting that the profits for the accounting beginning April 25, 1923, are $12,512.06.

(13) The Master erred in finding and reporting that a reasonable royalty should be $3.00 per car set, or $12,000.

(14) The Master erred in finding that a reasonable royalty should be paid on 4,000 car sets.

(15) The Master erred in finding and reporting that the reasonable royalty should bear interest from May 1, 1923.

(16) The Master erred in failing to find and report that a reasonable royalty should not be more than 25 cents per car set.

(17) The Master erred in failing to follow the injunction of the Circuit Court of Appeals that "It was a common expedient to provide a door with a two-step latch."

(18) The Master erred in finding and reporting that the established licensed rate of 10 cents on a hopper car door safety clutch and of 50 cents a car upon a door flanging, was not helpful in determining what is a reasonable royalty in this case.

(19) The Master erred in finding and reporting that "There was no manufacturing cost to the plaintiff, that all they did was some drafting, obtained the order and turned the order and drawings over to a foundry for manufacturing, with possibly some inspection."

(20 The Master erred in failing to find and report that a two-step latch was open to use by the plaintiff.

(21) The Master erred in failing to find and report that the defendant did not offer to sell the device of the patent in suit to the purchasing railroad company.

Respectfully submitted,

Geo. I. Haight,

M. K. Hobbs,

Counsel for Plaintiff.

MEMORANDUM OPINION

(Filed Apr. 13, 1933)

Killits, J.:

The record presents no occasion for questioning the conclusion that plaintiff's success in obtaining the Baltimore & Ohio contract against its sole competitor, the defendant cross-petitioner, was due to the former's infringement of the latter's protected two step locking device. While it is true that plaintiff's whole construction involved the employment of other features which were under protection of patents held by plaintiffs, wherefore, superficially, the doctrine of apportionment of profits is indicated as a possible element in the adjudication of cross-petitioner's damages, yet a fact situation which must be present fundamental to the application of the apportionment rule is not seen, here, to exist. The preliminary burden on the plaintiff to enable it to invoke this rule is not complete without a showing by it of an opportunity to the cross-petitioner to work under it. Some criteria the infringer should offer, or be found in the exemplified circumstances, before the burden of the rule shifts to the party seeking damages.

Both parties offered the railway company devices, equally satisfactory to it, except in the feature of locking—to put this matter in an aspect most favorable to the plaintiff. Indeed, the inference is strongly indicated that the purchaser would have preferred the Wine device at the price offered by the plaintiff, wherfore the thought that some patented feature in the complete structure, and under the exclusive control of plaintiff, influenced the latter's contract has no logical basis. The testimony of Mr. Campbell respecting the lack of any illumination in plaintiff's bookkeeping to aid apportionment leaves the application of that rule an exercise of merest speculation, beyond a reasonable office for expert testimony. The result is, in our opinion, as the Master concluded, that the only practicable measure of damages lay either in ascertainment of plaintiff's forfeitable profits, or the fixing of a proper royalty. Westinghouse vs. Wagner, 225 U. S., 604, 621.

Kadel's grant, under which cross-petitioner operated, was constructive notice to plaintiff when the contract was entered into with the railway company to avoid infringement; wherefore we see no merit in the contention that the Wine Company's recovery be limited to the infringements after the filing of the cross-petition. As the Wine Company had made no commercial use of the Kadel improvement before its cross-petition, the situation, we think, offers no reason for the application of Section 4900, R. S.

We also conclude that, in view of the compellable judgment that the railway contract would have gone to the Wine Company had it not been for plaintiff's underbidding through the proposal to use an infringeing device, the practical measure of damages is through the ascertainment of plaintiff's profits, rather than through an effort, largely speculative, to fix a royalty figure.

Considering that the plaintiff farmed out the manufactures of the infringing device, with no use of its operative structure save in the matter of correspondence, there is no opportunity here for application of an overhead percentage to diminish profits.

A question, which seemed most difficult to the Court, is whether, against the ascertained profits of $18,003.63, plaintiff should be allowed a deduction for income tax paid. We conclude against plaintiff on this contention, not altogether because of the decision in Larsen vs. Wrigley, 277 U. S., 97, but in view of the possibility, far from remote, that to allow such a deduction may involve an injustice to cross-petitioner, in that it may be called upon for a tax on this recovery through an enhancement of its taxable income, and under rates much more exacting than prevalent when plaintiff was assessed.

Exceptions of plaintiff to the Master's conclusions are severally overruled, and a decree is ordered that the cross-petitioner recover of plaintiff as damages the sum of $18,003.63, with interest and costs.

The Court commends the Master for the evident careful execution of his duties and the clarity of his report.

John M. Killits,
United States District Judge.

April 13, 1933.

DECREE CONFIRMING MASTER'S REPORT

(Entered June 15, 1933, Killits, Judge)

This cause came on to be heard at this term upon excepts of plaintiff to the Master's report filed herein, and was submitted on briefs, and thereupon, upon consideration thereof,

It is ordered, adjudged and decreed that the exceptions filed herein by plaintiff to the Master's conclusions be and the same hereby are severally overruled, and that cross-petitioner shall recover of plaintiff as damages the sum of Eighteen Thousand Three and 63/100 Dollars ($18,003.63) with interest from June 1, 1932, the date of the Master's report, and costs.

Dated June 15, 1933.

REQUEST FOR AND FINDINGS OF FACT AND CONCLUSIONS OF LAW SUBMITTED BY WINE RAILWAY APPLIANCE COMPANY

(Filed June 15, 1933)

In accordance with the provisions of Equity Rule 70½, the following findings of fact and conclusions of law are submitted by the Wine Railway Appliance Company for consideration by the Court:

FINDINGS OF FACT

1. Both parties, upon inquiries from B. & O., offered lock devices equally satisfactory to it.

2. Prior to placing the orders for the infringing locks involved in this accounting, the B. & O. had been using

plaintiff's winding type of dump door raising mechanism (Rec. p. 6), except that it tried out on its cars and found satisfactory some of the hook-type of door locks furnished by the Wine Company, cross-petitioner herein (Rec. p. 26).

3. That in the Fall of 1922, the B. & O. purchasing agent inquired of Enterprise Company, plaintiff herein, if it could furnish the latch or hook-type of equipment for hopper car doors, as distinguished from the raising mechanism type it had been furnishing. (Rec. p. 6.)

4. Upon receiving the B. & O. inquiry for latch or hook-type of equipment for hopper car doors, plaintiff (infringer) submitted a single step form of latch known as its "Ingoldsby latch." (Rec. p. 6).

5. This Ingoldsby type latch was not satisfactory to B. & O. and, at the request of its purchasing agent, drawings, Exhibit B, were later submitted by plaintiff of the "Ingoldsby latch" modified to include the double step feature similar to that of the Wine Company door locks, and this is the lock later accepted and ordered by the B. & O. (Rec. pp. 13, 17).

6. The Wine Company was the only competitor of plaintiff in the furnishing of door locks of the double step type to B. & O. (Rec. p. 14).

7. Wine Company had first refusal of B. & O. order for double step or Wine type of locks at B. & O. price. (Rec. pp. 50, 56).

8. Plaintiff accepted order of B. & O. for Wine type hooks like shown in drawing Exhibit B, at price offered by B. & O.

9. Wine Company pioneered type of lock involved in this accounting.

10. Plaintiff did not itself manufacture locks for B. & O. orders, but turned the orders over to the Ft. Pitt Malleable Iron Company, which made the parts comprising the orders and shipped to car builders specified in orders. Plaintiff merely secured the order on drawings, Exhibit B, prepared by it, turned them over the foundry for filling, and inspected castings. (Rec. pp. 19-21).

11. The infringing transactions, as stated by plaintiff's president, were merely an incident to the regular business of plaintiff. (Rec. pp. 76-78).

12. Plaintiff's infringing construction involved the employment of features which were under protection of patent held by it. Plaintiff kept no books or records by which claimed apportionment could be determined. Plaintiff's president claimed apportionment could not be determined by the books or records, and that "if we must find the relation of a patent to a device where more than one patent is involved, in my judgment there is no way possible except to give equal apportionment to all of the patents involved." (Rec. p. 79).

CONCLUSIONS OF LAW

1. Deductions from selling price of foundry costs for parts furnished, freight on parts, royalty paid by plaintiff of 50 cents per car set, and rebate of 50 cents per car set, as taken by plaintiff in its statement of account are proper.

2. Considering that plaintiff farmed out the manufacture of the infringing device, with no use of its operative structure save in the manner of correspondence, and that the infringing transaction was merely an incident to plaintiff's regular business, there is no opportunity here for application of overhead per centage to diminish profits, and plaintiff, therefore, is not entitled to a deduction for overhead.

3. Under circumstances of present case, plaintiff is not entitled to diminish profits by a deduction of income tax paid.

4. Under circumstances and proofs in present case, plaintiff is not entitled to apportionment of profits. The doctrine of confusion of goods applies.

5. Cross-petitioner assumed and discharged the burden on it as to apportionment, and after showing by testimony of plaintiff's president, that it was impossible to make a segregation of the profits, it was not necessary for

cross-petitioner to further prove such fact by expert testimony. Westinghouse v. Wagner, 225 U. S. 604, 621, holds that either but not both methods should be resorted to.

6. The contention of plaintiff that some feature in the infringing lock patented to it, and under its exclusive control, influenced the railway in purchasing its locks, has no logical basis in the case.

7. The testimony of plaintiff's president respecting the lack of illumination in plaintiff's bookkeeping to aid apportionment, leaves the application of the apportionment rule an exercise of merest speculation, beyond a reasonable office for expert testimony.

8. The claim in the present case is for a unitary concrete or complete structure, the omission of any of the parts of which destroys its whole and is not "a mere improvement on or addition to an old thing, making merely an increased or a different demand", as stated in Herman v. Youngstown, 216 Fed. 604,606, and apportionment, therefore, is not proper.

9. The only practicable measure of damages lay either in ascertainment of plaintiff's forfeitable profits, or the fixing of a proper royalty. Westinghouse v. Wagner, 225 U. S., 604, 621.

10. In view of the compellable judgment that the railway contract would have gone to the Wine Company had it not been for plaintiff's underbidding through the proposal to use an infringing device, the practical measure of damages is through the ascertainment of plaintiff's profits, rather than through an effort, largely speculative, to fix a royalty figure.

11. The preliminary burden on the plaintiff (infringer) to enable it to invoke the apportionment rule is not complete without a showing by it of an opportunity to the cross-petitioner to work under it. Some criteria the infringer should offer, or be found in the exemplified circumstances, before the burden of the rule shifts to the

party seeking profits or damages. This criteria is not present.

12. Section 4900 R. S. is not applicable in the present case to locks sold by plaintiff (infringer) prior to April 25, 1923, the date of filing the counterclaim by Wine Company. The grant of the Kadel patent involved in this accounting was constructive notice to plaintiff to avoid infringement, when the contract with the railway company was entered into. Wine Company had made no commercial use of the Kadel improvement before its cross-petition.

13. Cross-petitioner is entitled to recover of plaintiff as damages, the sum of $18,003.63, with interest from June 1, 1932, the date of the Master's report, and costs.

14. Exceptions of plaintiff to the Master's report are severally overruled.

Rspectfully submitted,
Owen & Owen,
Attorneys for Wine Railway
Appliance Company.

Chas. W. Owen,
Of Counsel.

MEMORANDUM OPINION

(Entered June 15, 1933, Killits, J.)

The findings of fact and conclusions of law submitted for the Court's consideration on the 2nd instant by counsel for Defendant are found satisfactory. Upon the correspondence between Defendants' Counsel and Plaintiffs' Counsel, exhibited to the Court, the findings of fact and Law, prepared by Defendants' Counsel are approved.
June 15, 1933.

ORDER ADOPTING FINDINGS OF FACT AND CONCLUSIONS OF LAW OF DEFENDANT

(Entered June 15, 1933)

Present: Honorable John M. Killits, U. S. District Judge.

The findings of fact and conclusions of law submitted for the Court's consideration by counsel for Defendant are found satisfactory, it is upon consideration.

Ordered, adjudged and decreed that the findings of fact and conclusions of law, submitted for the Court's consideration by Defendant's Counsel, is hereby approved.

STIPULATION

(Filed July 25, 1933)

It is hereby stipulated and agreed by and between the parties hereto by their respective attorneys, that the time within which the plaintiff-appellant shall lodge its narrative statement of evidence for appeal with the Clerk of the Court in pursuance of the rules of this Court, be extended to and including the 8th day of August, 1933.

M. K. Hobbs,
Attorney for Plaintiff-Appellant.
Owen & Owen,
Attorney for Defendant-Appellee.

Approved:
Geo. P. Hahn,
Judge.

STIPULATION

(Filed Aug. 11, 1933)

It is hereby stipulated and agreed by and between the parties hereto by their respective attorneys, that the time within which plaintiff-appellant shall lodge its narrative statement of evidence for appeal with the Clerk of the Court, in pursuance of the rules of this Court, be extended to and including the 30th day of August, 1933.

M. K. Hobbs,
Attorney for Plaintiff-Appellant.
Owen & Owen,
Attorney for Defendant-Appellee.

Approved:
Geo. P. Hahn,
Judge.

STIPULATION

(Filed Sept. 5, 1933)

It is hereby stipulated and agreed by and between the parties hereto by their respective attorneys, that the time within which plaintiff-appellant shall lodge its narrative statement of evidence for appeal with the Clerk of the Court, in pursuance of the rules of this Court, be extended to and including the 15th day of September, 1933.

M. K. Hobbs,
Attorney for Plaintiff-Appellant.
Owen & Owen,
Attorney for Defendant-Appellee.

Approved:
Geo. P. Hahn,
Judge.

STIPULATION

(Filed October 4, 1933)

It is stipulated and agreed by and between the parties hereto by their respective attorneys that the time of the plaintiff-appellant for filing the record and docketing the appeal in the United States Circuit Court of Appeals for the Sixth Circuit be extended to and including December 12, 1933.

It is further stipulated and agreed that this stipulation be incorporated in the printed record on appeal.

Geo. J. Haight,
Counsel for Plaintiff-Appellant.
Owen & Owen,
Counsel for Defendant-Appellee.

Approved:
Geo. P. Hahn,
Judge.

PETITION FOR APPEAL

(Filed Sept. 13, 1933)

The above named plaintiff, Enterprise Railway Equipment Company, feeling itself aggrieved by the decree of this court made and entered on the 15th day of June, 1933, in the above entitled cause, does hereby appeal from said decree to the United States Circuit Court of Appeals for the Sixth Circuit, for the reasons specified in the assignment of errors, filed herewith; and it prays that a transcript of the record, proceedings and documents, upon which said decree was based, duly authenticated, be sent to the United States Circuit Court of Appeals for the Sixth Circuit, under the rules of this court and of that court in such cases made and provided.

And the plaintiff further prays that the proper order relating to the security to be required of it be made.

Geo. I. Haight,
Attorney for Plaintiff.

ASSIGNMENT OF ERRORS

(Filed Sept. 13, 1933)

1. The court erred in decreeing that the defendant and cross-petitioner recover of plaintiff the sum of Eighteen Thousand Three Dollars and Sixty-three Cents ($18,003.63) with interest and costs.

2. The court erred in overruling each and every exception of the plaintiff to the Master's Report.

3. The court erred in finding that the accounting period in this case begins with the date of issue of the patent in suit.

4. The court erred in not limiting recovery to infringement occurring after the filing of the defendant's counter-claim.

5. The court erred in finding that the rule of apportionment does not apply in this case.

6. The court erred in not decreeing and awarding to the defendant nominal damages only.

7. The court erred in finding that the ascertainment of profits was the measure upon which to base recovery.

8. The court erred in not awarding to the defendant's reasonably royalty only.

9. The court erred in not finding that a reasonable royalty per car set of latches should be 25 cents per car set.

10. The court erred in finding that the railway contract would have gone to the defendant had it not been for the plaintiff's bid.

11. The court erred in not allowing to the plaintiff deduction for income taxes paid

12. The court erred in finding that both parties offered to the railway company lock devices equally satisfactory to it.

13. The court erred in holding that the defendant discharged the burden on it as to apportionment.

14. The court erred in finding that the plaintiff was not entitled to a deduction for overhead.

15. The court erred in holding that the doctrine of confusion of goods applies.

16. The court erred in finding that no feature of the infringing lock except its two-step construction influenced the railway in purchasing the locks.

17. The court erred in holding that the device in question is for a unitary structure.

18. The court erred in finding that Section 4900 of the Revised Statutes is not applicable to the case at bar.

19. The court erred in holding that the grant of the Kadel patent in suit was constructive notice.

20. The court erred in failing to find that the plaintiff is entitled to an apportionment of profits because of its contributions to the infringing structure and its installation.

21. The court erred in finding that the entire marketability of the infringing structure was dependent upon the double-step feature.

22. The court erred in not finding that the defendant did not offer to sell the device of the patent in suit to the purchasing railroad company.

Geo. I. Haight,
Attorney for Plaintiff.

ORDER ALLOWING APPEAL AND FIXING BOND

(Entered Sept. 13, 1933, by Hahn, Judge)

On motion of Geo. I. Haight, attorney for the plaintiff above named, it is hereby ordered that an appeal to the United States Circuit Court of Appeals for the Sixth Circuit, from the decree heretofore filed and entered herein on the 15th day of June, 1933, be and the same is hereby allowed, and that a certified copy of the transcript of record, testimony, exhibits, stipulations and all proceedings necessary for appeal be forthwith transmitted to said United States Circuit Court of Appeals for the Sixth Circuit.

It is further ordered that the bond on appeal be fixed at the sum of $22,500.00, the same to act as a supersedeas bond and also as a bond for costs and damages on appeal, such bond to be filed within twenty (20) days from entry of this order.

SUPERSEDEAS AND APPEAL BOND

(Approved by the Hon. Geo. P. Hahn, and filed Oct. 3, 1933)

No. 732460-D

Know all men by these presents that we, Interprise Railway Equipment Company, a corporation of the State of Illinois, as Principal, and American Surety Company of New York, a corporation of the State of New York, as Surety, are held and firmly bound unto Wine Railway Appliance Company, a corporation of the State of Ohio, in the penal sum of Twenty-two Thousand Five Hundred Dollars ($22,500), good and lawful money of the United States, to the payment of which well and truly to be made, we bind ourselves, our heirs, legal representatives, executors, successors and assigns and administrators, jointly, severally and firmly by these presents.

The condition of this obligation is that that, Whereas the above named, Wine Railway Appliance Company did, on the 15th day of June, 1933, in the United States District Court for the Northern District of Ohio, Western Division, obtain a judgment and decree against the above bounden Enterprise Railway Equipment Company for the sum of Eighteen Thousand Three and 63/100 Dollars ($18,003.63) with interest and costs; and

Whereas, to reverse said judgment and decree the said Enterprise Railway Equipment Company has filed its petition for appeal to the United States Circuit Court of Appeals for the Sixth Circuit and the Honorable George P. Hahn, Judge of said United States District Court, did, on the 13th day of September, 1933, enter an order allowing said appeal and further ordering that the bond on said appeal be fixed at the sum of Twenty-two Thousand Five Hundred Dollars ($22,500), the same to act as a supersedeas bond and also as a bond for costs and damages on said appeal:

Now, Therefore, if the said Enterprise Railway Equipment Company shall duly prosecute said appeal and pay or cause to be paid the amount of said decree and judgment

and in addition, all judgments, awards, costs, interest and damages which the said United States Circuit Court of Appeals for the Sixth Circuit shall adjudge against it in case the said judgment and decree shall be affirmed and abide by the order and judgment of said United States Circuit Court of Appeals in this behalf; then this obligation to be void; otherwise to remain in full force and effect.

In witness whereof we have hereunto set our hands and seals this 30 day of September, A. D. 1933.

Enterprise Railway Equipment Company.
(Corporate Seal) By Argyle Campbell,
President.

Attest:
M. F. Back,
Secretary.

American Surety Company of New York.
By B. H. Davenport,
Res. Vice Pres.
(Surety Company Seal)

Attest:
M. Berg,
Res Asst. Secretary. M. Berg.

Approved:
Geo. F. Hahn,
U. S. District Judge.

CITATION

(Filed Sept. 13, 1933)

United States Circuit Court of Appeals for the Sixth Circuit:

To Wine Railway Appliance Company, Greeting:

You are hereby cited and admonished to be and appear at a session of the United States Circuit Court of Appeals for the Sixth Circuit, to be held at the City of Cincinnati in said Circuit on the 13th day of October next, pursuant to an appeal filed in the Clerk's office of the District Court of the United States for the Northern District of Ohio

Wherein Enterprise Railway Equipment Company is appellant and you are appellee, to show cause, if any there be, why the decree rendered against the appellant, as in the said petition for appeal mentioned, should not be corrected and why speedy justice should not be done to the parties in that behalf.

Witness the Honorable Charles Evans Hughes, Chief Justice of the United States, this 13th day of September in the year of Our Lord One Thousand Nine Hundred Thirty-three and of the Independence of the United States of America the One Hundred Fifty-seventh.

Geo. P. Hahn,
Judge of the District Court.

Service of the above citation is hereby acknowledged and the appearance of Charles W. Owens for Wine Railway Appliance Company is hereby entered.

Owen & Owen.

STIPULATION RESPECTING NARRATIVE STATEMENT OF EVIDENCE

(Filed Sept. 13, 1933)

It is hereby stipulated, by and between the parties hereto, by their respective attorneys of record, subject to the approval of the court, that the narrative statement of evidence submitted herewith is true, properly prepared, and contains all of the testimony heard before the Master material to the hearing of the appeal in said cause, reduced to narrative form, save in those instances where portions of said testimony appear in the exact words of the witnesses, in which cases such exact quotation is necessary, in order that the sense and understanding thereof may be determined. And the defendant-appellee in the above entitled cause, waives notice of the lodging of said narrative

statement of evidence with the Clerk of the Court and waives notice of the time of the proposed settlement thereof.

Geo. I. Haight,
Plaintiff-Appellant.
Owen & Owens,
Defendant-Appellee.

NARRATIVE STATEMENT OF EVIDENCE

(Filed Sept. 13, 1933)

ARGYLE CAMPBELL,

being called as a witness, and being first duly sworn, testified as follows:

DIRECT EXAMINATION

By Mr. Owen:

My name is Argyle Campbell; resident, 6922 Jeffrey Avenue, Chicago, Illinois; occupation, President of the Enterprise Railway Equipment Company.

The business of the Enterprise Company in 1922 and 1923 was the designing of railway equipment, and the promotion and sale of door devices for all types of load discharging cars. Our door operating devices are known as the Enterprise devices, and we have had a device known as the Ingoldsby device, Ingoldsby door latch.

The dump door raising and holding devices are most usually of what we call the link type, being formed of hubs and links flexibility riveted together, which wind around the hub castings located on the operating shafts. This is the type customarily referred to as the winding type of door raising and holding mechanism.

The Ingoldsby form of door lock was usually what we term a latch that was thrown in under the door after it was raised, sometimes went automatically under. In the usual Ingoldsby car, a winding mechanism was used, and the latch was thrown in afterwards. It was usual in the Ingoldsby, as well as the Enterprise, to close the doors by a

winding mechanism; the Enterprise had an automatic lock; the doors were locked when they were closed, whereas with the Ingoldsby it was customary to throw in an auxiliary latch.

The principal business of the Enterprise Company in the years 1922 and 1923 was the sale of the dump door raising and holding mechanism of the Enterprise and Ingoldsby types. The selling of the lock constituting the infringement in this proceeding was merely an incident to the regular business of the Enterprise Company. The so-called infringing order was given by the Baltimore & Ohio Railway Company.

We had been furnishing the B. & O. Railroad with what we call our type D door operating mechanism for hopper cars. That is the Enterprise type. And in the Fall of 1922, while I was in Baltimore in connection with the sale of those devices, it developed that they were going to want more equipment that Fall, and Mr. Thornley, Assistant Purchasing Agent, asked me one day if we had latch equipment for hopper cars, and I told him we had, and would I send him some information about them, give him some information about them, which I did. And I made several visits to Baltimore during the Fall of 1922 in connection with the new equipment that was to come about, and perhaps—possibly at least—had some pertinence to the equipment that had been ordered. And I was subsequently asked to make quotations upon the Ingoldsby latch for equipment, and also on the Enterprise type D door operating mechanism, for several thousand cars. So we submitted quotations upon both those devices. We then went over those with the mechanical officers, and during the conversation, as I remember, there were other types of cars brought into it, just in a general way, as to what we might recommend for some other cars, as, for example, some side swing door hopper cars. So we submitted, during that Fall, several different drawings, and later on, when this lot of cars which were inquired for in November as being finally settled, we received word that the cars had been bought, and that the specialties would be purchased

early in January. So I went down there right after the 1st of January, on or about that time, and, you might say, became quite active as to solicitation of the business, and made some modifications in our designs. We not only had submitted to them the Enterprise type D and the Ingoldsby latch, but in addition we had submitted to them another form of door latch which we have always termed a bar latch, because the bar went clear across the door and latched the two sides of the individual door, whereas this Ingoldsby latch that we had figured upon, that took care of the two, two latches took care of two doors, one being on each extreme side of the car; so we had also submitted this bar latch.

And so in January we took some new drawings, and Mr. Dorey came to Baltimore and it narrowed down that we were told that they were not going to the expense of door operating mechanism, they wanted a latch. By that time it had narrowed down to the latch equipment. So early in January of 1923 we had submitted these two for final approval, and we did not know which one they were more likely to take, the Ingoldsby latch or the Enterprise bar latch, and after submitting those we were shortly advised that we would be given the business on the basis of the Ingoldsby latch, not the Ingoldsby bar latch but the Ingoldsby, which was subsequently furnished, only varying the design; it was only very slightly modified. There were some slight modifications in the detail of the design as a whole after that time.

You ask what became of the bar latch. If you mean, so far as the B. & O. is concerned, I would only say that afterwards the B. & O. adopted a latch of their own get-up, that was kindred and similar to our bar latch, in principle generally the same, a latch on the door that fell into a hook at the side, and that has since been their use of latches, to the best of my knowledge and belief.

You have confused bar latch with the Ingoldsby latch. They are both on an entirely different principle. The Ingoldsby latch as used on the B. & O. cars was a latch which is on the side of the hopper and moves parallel or nearly

so with the side hopper sheet of the car, whereas the bar latch which I referred to is parallel, or substantially generally so, to the door, and therefore has the reverse direction; the Ingoldsby latch works parallel to the hopper at the side of the car; the bar latch works parallel, or substantially so, to the car door, which makes a right angle difference of the two members, the way the two members work.

Now, as to your question or misunderstanding as to that Ingoldsby latch always being a lifted, or the door is lifted by the device, that was the point that I tried to make clear when you asked me previously about both the Enterprise and the Ingoldsby devices. The Ingoldsby device as used on ore cars for many years in the practice was a device where the doors were lifted by lever arms from the bottom, or chains, or one means or another—there were several—but they subsequently, and after the doors were up, threw in a latch device, and they were coupled together, as a rule more than one latch worked together, so that they were thrown in under to form an additional lock for the car door. It was an auxiliary thing, a lifting device.

Now, the Ingoldsby latch—the Ingoldsby-Enterprise latch is the way they termed it most generally in their own business—the Ingoldsby latch as applied to the B. & O. car, there was no lifting device whatsoever. The doors there were closed by hand, or foot, and the latch fell in when the door was up.

The type of latch known as the Ingoldsby latch, employed on ore cars some form of mechanical raising mechanism for the door, and after the door was raised a latch either dropped into position or was moved into position to hold the door in closed position. But that was not the way of the latch as applied to the B. & O. cars in question.

The Ingoldsby form of door raising and holding mechanism embodied a mechanical means, either of the winding type or the lever type, or possibly some other type, for raising the door to the closed position, and then a latch was used to hold the door in that position.

The type of mechanism embodied in this accounting, and for which the order was taken by the Enterprise Company from the B. & O., did not include a mechanical raising mechanism, but merely embodied a latch and an engaging member for the latch, and that particular latch is different from the latch referred to as the Enterprise bar type.

There were really three forms or types of door raising and holding mechanisms put out by the Enterprise Company prior to the taking of the B. & O. order, and in addition to the type of latch involved in said order, said three types of latches being, first, the Enterprise type which included a mechanical raising mechanism and a holding latch member, second, the Enterprise bar type of latch, and third, the Ingoldsby type of latch.

We had others besides those. Just those three cover the situation as having pertinence to the matters before us today.

Some time in the Fall of 1922, or possibly earlier, we endeavored to sell the B. & O. Company some one of the types of door raising and holding mechanisms that were then being sold by the Enterprise Company. We had previously sold them many thousands of car sets of door mechanisms.

The first change to the type of lock involved in this accounting proceeding was when I was asked by Mr. Thornley in September of 1922, if we had latch equipment. We first submitted drawings on a door holding mechanism of the latch equipment type in the early fall of 1922. I have a drawing of the form of latch that was submitted at that time.

"Q34. This drawing, Exhibit A, was submitted to the B. & O. after you had determined that the B. & O. Company wanted a latch type of door holding mechanism as distinguished from one employing a mechanical raising feature; is that correct?

A. I would say that I had learned that they wanted to consider a latch type as against the

straight door operating mechanism type, that we had been furnishing.

Q35. When did you change from the form of lock shown in Exhibit A to the form of lock for which the order was given by the B. & O.?

A. There were several drawings submitted pertinent to the Ingoldsby type of latch, and modifications were made up to and after the placing of the order in January."

The drawing of the latch construction that was finally accepted by the B. & O. is produced as Exhibit B.

Exhibit A shows what may be termed a single step latch construction, and Exhibit B shows what may be termed a double step latch construction. The latch shown in Exhibit B is the same as the latch shown in the assembly sheet marked "A" appearing as page 119 of the printed record on appeal in this case.

"Q42. How did you happen to change from the single step latch construction shown in Exhibit A to the double step latch construction shown in Exhibit B, and which latter is the latch construction involved in this accounting?

A. Some of the railway officers thought they wanted that; wanted the double step.

Q43. Was it necessary to make this change in order to secure the order?

A. "That question I cannot answer. It was a request, but I can't say that it was or was not necessary; there were other requests that were made, modifications. They wanted to use a specific form of door bracing, and we changed to it."

The Wine Company was bidding for this order, and I think probably there was one or more others; but whether they were considered or not, I can't say. In other words, I don't think there was anything exclusive about it.

"Q. Were any of the competing bidders putting out latches of the double step engaging type at that time?

A. Yes.

Q. What companies?
A. The Wine Company.
Q. That was the only company?
A. Yes, so far as I know."

The bidding, or rather the securing of the order from the B. & O. Company probably rested between the Wine Company and the Enterprise Company, but I cannot be sure.

When talking about this matter in your office yesterday, I don't remember any such remark as that I took the order in question away from the Wine Company.

The previous business that we had was on the other types of door raising and holding mechanisms to which I referred in my previous testimony.

I don't think it is correct that the B. & O. officials, in giving the present order, wanted to make a change from the former types of door closing and holding mechanisms which it had been using, to the hook type which eliminated the use of mechanical raising means for the door.

The B. & O. Railroad were desirous of considering anything that was cheap; or cheaper than what they were using, and they were not desirous of changing from what they had; it was only a matter of dollars and cents. They had been advised that there was cheaper things. Now, could we offer what was called a cheaper thing, a latch, and we said, yes, we had it. But they were not desirous of changing; there is nothing in the testimony about that, because they weren't. And they told me so.

A latch is cheaper than a door mechanism. It weighs less.

Preliminary to submitting the drawing, Exhibit B, to the B. & O. Company, we had received request from them to change the latch construction to the double step instead of the single step type. I have the B. & O.'s inquiry; it just asks for the Ingoldsby latch.

Witness produces paper—Exhibit C.

On November 21, 1922, we made quotation to Mr. W. S. Galloway, Purchasing Agent, covering the latch, Exhibit D.

The letter, Exhibit D, refers to a schedule No. 461.

The schedule and drawing referred to in Exhibit D are produced and marked Exhibit E.

The lock shown on the drawing in Exhibit E is of the single step type. The lock parts furnished under the B. & O. order were manufactured by our usual source of supply —the Fort Pitt Malleable Iron Company. We give them formal orders to cover the material wanted, and furnish them with drawings, details, sometimes patterns, but not always patterns. In the present case, drawings were furnished the foundry. After the parts were made by the foundry, they were sent to the car builder. Our company did not have any handling of the parts, only inspection.

"Q. If you obtained the order from the B. & O. for the door locks in question, why does the statement of account filed herein refer to different car builders as purchasers?

A. Car builders purchased the material at the direction of the B. & O. Railroad, and they paid their price for it as specified by the railroad, and there was a small refund to the railroad from that price, for the difference net prices to the railroad.

Q. The statement of account filed herein appears to base the cost price of the locks sold on foundry invoices. Have you the invoices referred to in the statement?

A. Yes, we have. (Witness produces papers).

Q. It is my understanding from the statement of account rendered that the amounts of these invoices for the different car builders have been totaled, and that the amounts contained in the statement under the cost price column represent the actual foundry cost to you of the parts furnished by you to the car builders; is that correct?

A. The actual foundry costs, yes. It is not the total net cost to us."

I have a railway acceptance and notification to car builders in connection with the order received. This is for the five different car builders.

I produce the Enterprise acceptance letter, dated January 11, 1923, addressed to W. S. Galloway, Purchasing Agent, Baltimore & Ohio Railroad Company—Exhibit F.

The letter, Exhibit F, refers to a drawing No. 3626, which I produce as Exhibit G.

According to the statement of account filed herein, two of the purchase orders, namely, the Ralstin Steel Car Company and the Pressed Steel Car Company, were dated January 10, 1923, whereas the acceptance was dated January 11, 1923. That is the time of the orders of the car company, not the railroad company; the individual car companies send in orders, and they might have come after the 11th, or any time; probably some of them did come after, either before or after; that would be immaterial. We would go ahead anyway on the work of the railroad company.

The parts of the lock which were furnished by the car builders were made under drawings and instructions furnished by our company. The parts of the locks furnished by the car builders was in their quotation to the railroad; the rilroad would pay that.

WILLIAM E. WINE,

being called as a witness on behalf of the Wine Railway Appliance Company, and being first duly sworn, testified as follows:

DIRECT EXAMINATION

By Mr. Owen:

My name is William E. Wine; residence, Toledo; President of the Wine Railway Appliance Co.

We had an inquiry from the B. & O. Railroad asking for prices on door locks for two thousand twin hopper cars. And I have charge of all the sales of our company, so I naturally was in touch with this situation, the same as I am with any other sales proposition of the company. Mr. Beck, our New York man at that time, had charge of the sales on this, on the B. & O. Railroad. We attempted to

secure the order from the B. & O. Company for the locks which it required.

The letter in Exhibit H is a copy of our quotation to the B. & O. Railroad, November 27, 1922, covering Wine door lock parts for the two thousand hopper cars they were contemplating purchasing.

The telegram bearing the stamp January 8, 1923, in Exhibit H, was received on the date marked in the right hand corner.

The letter dated January 9, 1923, in Exhibit H, addressed to W. E. Wine, President, The Wine Railway Appliance Company, Toledo, Ohio, and signed, "Peter P. Beck", was received by Wine Company. I recognize the signature on this letter as being that of Peter Beck. Mr. Beck at that time was our agent. His title was Assistant to the President. I met Mr. Beck in Baltimore on three or four occasions while this matter was pending. That is the same Beck whose name appears on the telegram dated January 8th.

My company did not receive the order for the B. & O. locks for which we were negotiating at this time. I now know who received the order. At that time I thought I knew, but I couldn't have sworn to it, because I hadn't seen the order; but I have seen it since.

In the letter of November 27, 1922, contained in Exhibit H, we quote the price of $13.50 per car set f. o. b. Toledo for the brackets, hooks and pawls contained in a car set of door locks on which we were quoting. The price of $13.50 includes the cost of material and overhead, profit, and $1.50 a car–royalty on a door lock. The royalty was paid to Mr. Kadel under the contract with him, under all patents that he owns on door locks. A particular patent mentioned is No. 1,268,725. We pay a royalty of $1.50 on all locks furnished by us. If we had received the order from the B. & O. for the locks which it required for its cars in the latter part of 1922 or in 1923, we would have been required to pay a royalty of $1.50 for each set of locks so furnished.

We have no way of telling what the selling costs are. The cost of the material entering into each car set of these door locks as listed in our letter of November 27th was approximately 50 pounds of material, for which we were paying 8⅓ cents a pound at that time.

About the overhead charge against locks of this character in 1923, we have no way of dividing our overhead. We manufacture door locks and side bearing ladders and fruit car ventilators for railroad cars, and we have not up until the last few years segregated our overhead over any of the departments of our business. At that time, in 1922 and 1923, we had no means of distributing the overhead to any particular department of the business.

The lock on which we quoted prices to the B. & O. by our letter of November 27, 1922, was our setndard type of door lock, including two step hook, and still is.

CROSS EXAMINATION

By Mr. Hobbs:

Before the inquiry of the B. & O. Railroad Company to us, to which inquiry we responded in our letter of November 27, 1922, which is part of Exhibit H, we had done business with the B. & O. Railroad. We had sold them door locks. I can't say just when, because we started this door lock business in 1918. I can't say definitely just what date it was that we sold the B. & O., which led up to this; prior to this inquiry from the B. & O., we had received orders for door locks which had been tried out on their equipment and found to be satisfactory. We would not have had the inquiry from the B. & O. if they had not tried them out.

In our letter of November 27th we did not refer to any drawing, and if any drawings were made up for the B. & O., they were made up after this quotation was made. I never had any.

The lock on which we quoted prices was made under the Pilcher-Kadel patent, No. 1,268,725. That is the patent upon which we paid a royalty of $1.50 to Mr. Kadel and Mr. Pilcher. There is no two step hook shown.

When we replied to the inquiry of the B: & O. in our letter of November 27, 1922, we were quoting prices on a two step latch lock. The drawing which I will produce will show that.

We did not quote the B. & O. Railroad on more than 2000 cars to my knowledge about this.

I said we would have had to pay $1.50 royalty on the lock which you made under all the patents which were used in the making of that lock. I mentioned one patent only, namely, the one to Pilcher and Kadel, No. 1,268,725. We did not have to pay royalty on any other. All the patents that are owned by Mr. Kadel would come within the contract.

The Cremean reissue patent No. 15360 is owned by the Railway Appliance Co.

"XQ45. The locks which you made for the B. & O. Railroad, will you describe them and identify them, if you can, by telling us under what patent they were made, or patents?

A. I cannot off hand tell you just what patents they were made under. One patent is the Cremean patent, the Pilcher-Kadel patent.

Mr. Owen:

Would this help you any? (Referring to file of correspondence.)

The Witness:

I can list them. Pilcher Kadel Patent 1,268,725; Cremean reissue patent 15360; Wine patent 1,431,499; Wine patent 1,433,056; Wine patent 1,434,177; Kadel patent 1,434,953. That is all that I can recall.

XQ46. And the locks that you were quoting on to the B. & O. in your letter of November 27, 1922, would have been locks embodying all of those patents that you just enumerated?

A. To my knowledge, yes."

We could use any of the Kadel patents for $1.50 royalty per set. The Kadel and Pilcher patents—were included. We were not quoting the B. & O. Railroad on locks made under the claims of the Kadel patent in issue.

We contemplated making for the B. & O. Railroad locks with a two step engagement, the two step engagement being made possible by a channel shapped member attached to the door.

We never made any devices like the drawing in the Kadel patent in suit.

The list of patents which I gave, upon which we pay $1.50 royalty, is not a complete list. I cannot furnish you with a complete list because there are a number of them being in process of becoming patents now.

The contract upon which we pay $1.50 royalty upon the locks put out, includes patents that were in existence in 1922 and 1923 and all improvements. So that $1.50 royalty might include hundreds of patents before the contract expires.

REDIRECT EXAMINATION

By Mr. Owen:

In giving a list of some of the patents mentioned on cross examination, I read from a letter. This is a copy of a letter written in Baltimore by Mr. Beck, to Mr. George H. Morrison, Chief of Motor Power & Equipment, Baltimore & Ohio Railroad, Baltimore, Maryland. That was January 29, 1923.

"Dear Sir:

We believe the door locking mechanism which has been submitted to you in competition with the Wine drop door lock is a direct infringement of the following patents:

Kadel & Pilcher	1,268,725
Cremean reissue	15,360
Wine	1,431,499
Wine	1,431,506
Wine	1,433,056
Wine	1,434,177
Kadel	1,434,953

Also on latch application. Would suggest that an

opinion on this be obtained from the Eastern Railroad Association.

Your truly,
The Wine Railway Appliance Company.
By.....'

At the time this letter was written I did not know of any other door locking mechanism that had been submitted to the B. & O. in competition with our drop door lock than the one submitted by the Enterprise Company on which the order was obtained around the forepart of January 1923, and which is the lock involved in this accounting proceedings.

RECROSS EXAMINATION

By Mr. Hobbs:

It is my opinion now that the statement in this letter of January 29, 1923, addressed by the Wine Railway Appliance Company to Mr. George H. Morrison, that the lock referred to as being submitted in competition with the Wine drop door lock referred to the Enterprise lock.

I think I supplied Mr. Beck with the numbers of the patents. I think that there is no question about infringing the one patent there. The others, I don't recall just what the patents are. At the time I wrote this letter, I thought that the Enerprise lock embodied the features of these patents.

I have a picture before me, which illustrates the lock upon which we quoted to the B. & O. Company with reference to the order in question. I have two sheets here taken from a catalog of the Wine Company, one showing a hook, bracket and pawl. The other parts of the device shown in these photographs were not included in the quotation.

Page 21 of the catalog referred to, particular reference being had to the picture enclosed with red lead pencil marks, marked Enterprise Exhibit 1, and as Enterprise Exhibit 2, page 18 of the catalog referred to, particular reference being had to the picture enclosed in the red lead pencil marks.

Referring to Enterprise Exhibit 1, we proposed to furnish to the B. & O. Railroad Company the bracket marked in red pencil "A," pawl marked "B" and hook marked "C". That lock is not applied to the particular type of car to which the locks and the order in question were to be applied. The picture in red on Enterprise Exhibit 2 shows the lock applied to the hopper car of the kind in question. The lock we proposed to furnish had no provisions for the fulcrum for a lever, as the picture shows.

"Enterprise Exhibit 3", a patent to Pilcher, No. 1,434,145, Figs. 1 and 2 in the patent drawings of that patent, are a correct or substantially correct illustration of the lock we proposed to furnish the B. & O. on the order in question. I would think that the Pilcher patent just referred to, is one of the patents which we had a right to use for the payment of the $1.50 per car set of locks. I have other patents before me, since I testified a few moments ago, which we had the right to use in building locks on the payment of $1.50 royalty per car set, viz.: Kadel-Pilcher No. 1,268,725, Enterprise Exhibit No. 4; B. W. Kadel No. 1,434,123, Enterprise Exhibit No. 5; No. 1,434,953 to B. W. Kadel, Enterprise Exhibit No. 6; No. 1,434,954 to B. W. Kadel, Enterprise Exhibit No. 7.

There were some applications pending at the time in question, which we would also have the right to use.

"Mr. Hobbs:

I want to offer in evidence, first, printed copy of the opinion of the Circuit Court of Appeals in this suit, so that the Master will have it for his information, which may be marked 'Enterprise Exhibit No. 8.'

The parties agree that the printed record on appeal in the Circuit Court of Appeals may be considered a part of the record before the Master on the accounting, thus obviating the necessity of its formal introduction in evidence.

I wish to offer in evidence as 'Enterprise Exhibit No. 9,' the drawing which was attached to the answer to the interrogatories propounded by the Wine

Company. That appears in the record at page 123, just that single sheet, but I wish to have it in formally.

I also wish to offer in evidence as 'Enterprise Exhibit 10' page 122 of the printed record, also being a drawing attached to the answers to interrogatories propounded by the Wine Company.

I offer in evidence a diagrammatic drawing of the device of the Kadel patent and the infringing lock, which drawing has heretofore been used in the suit, as 'Enterprise Exhibit 11'."

ARGYLE CAMPBELL,

called as a witness on behalf of Enterprise Railway Equipment Company, having been heretofore duly sworn, testified as follows:

DIRECT EXAMINATION

By Mr. Hobbs:

The letter dated June 5, 1923, addressed to Mr. F. V. Sage, was written and signed by me, as President of the Enterprise Company. (Exhibit 12).

I recognize the contract between the Enterprise Railway Equipment Company, on the one hand, and Ralph V. Sage and Ralph E. Wilder, on the other hand, dated June 30, 1922, and the signatures appearing thereon. (Exhibit 13). This contract was in force at the time the Enterprise locks were sold to the B. & O. Railroad, and were manufactured for it.

Sage and Wilder patent No. 1,204,692 is Exhibit 14.

Exhibit No. 12, which has been referred to as the Sage letter, states that a check of $2,000.00 is forwarded to Mr. Sage covering royalty at 50 cents per car on door flanging as per patent 1,204,692 covering Baltimore & Ohio 55-ton hopper cars, built 1,000 by American Car & Foundry Company, 500 by Standard Steel Car Company, 1500 by Pressed Steel Car Company, 500 by Ralston Steel Car Company, and 500 by Youngstown Steel Car Company. I enclosed

such check referred to in the letter, and that $2,000.00 was paid. It was a royalty on flaring of the doors on those cars.

I produce a photograph, Exhibit 15, which illustrates the device covered by that patent and the part that it played in the order referred to. It relates to the flanging of car doors, and on the one in question it is shown here, in this drawing, Enterprise Exhibit 9, in the upper left hand corner, the purpose being that the door brace can be made straight without bending the door brace and preserve the strength of the door flange. The parts furnished to the B. & O. Railroad included the use of those.

Referring to Enterprise Exhibit 15, the flange referred to, and also the flare in the flange referred to, are marked "A" and "B", respectively.

Previous to the use of this Sage-Wilder patent, it had been customary to cut the car door flange for this brace member to pass through. That meant that on a car such as we were considering there, there were 32 large door flange cutouts, there were 64 clips provided that took 128 rivets per car, which meant the punching of 128 holes and driving 128 rivets in addition to furnishing the clips and cutting of these holes, which meant a very considerable manufacturing saving—a very large one. The Sage-Wilder patent offered us the possibility of letting the car builder put that in at no extra cost, you might say, because it was just in the dye, and you had to have the dyes anyway, and this kind of a dye costs no more than that kind of a dye, and it saved all of this labor previously referred to. So at 50 cents a car it meant a very large saving in dollars and cents in the manufacture of this type of car particularly, and also in the other types of cars, the hopper cars such as the one referred to. And that accounts for the desirability on our part of having the use of the Sage-Wilder patent on a royalty basis, so this shows the way we were doing the job; this drawing also shows it, but in this case there was a greater number of rivets than I have illustrated. This was a triangular-shaped piece on this drawing, and

this was our more accustomed way of doing it, rather than this, and this made a better shape but took a still greater number of rivets and parts.

The pencil drawings referred to, are Exhibits 16 and 17, respectively.

Exhibit 18 is the blueprint referred to.

The sale of locks to the B. & O. Railroad permitted the use of the device of the Sage and Wilder patent. In permitting the railroad to use the Sage and Wilder patent, we assumed the royalty on it and paid it.

The B. & O. Railroad wished to use a heavy door brace, and have it straight continuous across the car, thereby saving the cost of putting in the bend in the brace or the notching out of the door flange, and on the photograph it shows the application of the door brace, the latch, the car door and the car door flange used and under which the Enterprise assumed the royalty, or paid the royalty to the Sage-Winder people according to their contract, and formed a part of the agreement with the railroad as to the sale and purchase of the latch.

The door flanges on the two car doors in Exhibit 19, one under each side of the center fill, are flared on their inner sides in order that a door brace may be attached to the plane of the door and across over the flanges of the car doors without notching the car door flanges or without bending the car door brace. This relates to the inner flanges of the car doors only, and the outer flanges of the car doors, at the sides of the cars, are not flared since the extensions on the car door brace are of lesser depth than the car door brace, which extends from side to side of the car, but not outside of the hoppers.

The saving in portions of construction because of the permitted use of the Sage and Wilder patent, are: It avoids the necessity for cutting the car door flanges at their inner sides, and thereby losing to some extent the strength and efficiency of the flanges, or it avoids the necessity of putting an offset in the car door braces that they may pass over the car door flanges referred to. The more

doors there are in a car, the greater the saving effected.

The Enterprise Railway Equipment Company had sold Ingoldsby latches of the kind and type involved in this proceeding before the sale to the B. & O. Railroad for gondola cars. The Enterprise Company, prior to the sale to the B. & O. Company, sold Ingoldsby latches illustrated in Exhibit 20, from Car Builders Cyclopedia of 1922. It was to the Chicago, Burlington & Quincy, in the Spring of 1922 for 2000 cars.

The letter, Exhibit 21, dated December 4, 1922, addressed to me, and signed by Mr. Sandman, I recognize and I know the signature of Mr. Sandman. Mr. Sandman was the mechanical engineer of the Baltimore & Ohio Railroad at that time.

Exhibit 22 is a letter dated December 28, 1922, addressed to Mr. Thornley, Assistant Purchasing Agent, Baltimore & Ohio Railroad, Baltimore, Maryland. I wrote this letter at that time to Mr. Thornley, then assistant purchasing agent of the railway company.

On the fifth of January or thereabouts, in 1923, at the time we were negotiating with the Baltimore & Ohio Railroad for the purchase and sale of the locks in question, I had a conversation with Mr. Galloway, the purchasing agent of the B. & O. Railroad, just before we made the sale. The conversation took place in Mr. Galloway's office. Mr. Galloway and myself were present. I called on Mr. Galloway on that date, feeling that the business would probably be settled, and after my card was sent in there was a little delay, and then Mr. Beck, of the Wine Company, called and sent in his card. Mr. Beck and I chatted for a few moments. We were both waiting. And shortly Mr. Beck was sent for. He represented the Wine Company in that particular territory, as I understood it. He is the Mr. Beck who has been referred to in the testimony here before. So Mr. Beck went in to see Mr. Galloway, and a little later came out, after which I was sent for, and I went into Mr. Galloway's office, and he told me that he had seen Mr. Beck first and had made Mr. Beck an offer, which Mr.

Beck had declined on behalf of his company, and that he was going to give me the business for my company. That is substantially all it amounted to.

I know the signatures on Exhibit 23, a contract dated November 15, 1919, between Enterprise Railway Equipment Company and Pressed Steel Car Company. It is a contract made between the Enterprise Railway Equipment Company and the Pressed Steel Car Company, granting the Enterprise Company the use of the Lindstrom patent 865,920, owned by the Pressed Steel Car Company, for improvements in safety clutch device for car door mechanisms, and grants this use for a consideration of ten cents per car without regard to the number of safety clutch devices which may be used.

The Enterprise Company have a patent dated April 22, 1913, and being No. 1,059,422, to Zimmer, Exhibit 24, which provided for a lost motion safety clutch at the side of the car, whereby the mechanism could be opened or closed without danger to the operator even though he held on to the operating bar. This safety clutch as illustrated in the Zimmer patent above referred to, was used in the car builders' dictionary of 1922, and in issues for other years as a device of very great importance since it provided safety for the operator and thereby prevented damage suits which had previously been very expensive to railway companies.

The Pressed Steel Car Company subsequent to our early promotion of the Zimmer patent claimed that the Zimmer patent was an infringement of their Lindstrom patent No. 865,920, Exhibit 25, which was of earlier date, and that we were infringing the claims thereof. This matter was discussed, and in the Fall of 1919 while at a conference in the Pressed Steel Car Company's office in New York, I agreed to pay a royalty for the use of the Lindstrom clutch patent No. 865,920, and the amount of the royalty as agreed upon was determined to be ten cents per car.

A door mechanism is more expensive than a latch, and

safety clutch formed a very large and important part of the door operating mechanism; the safety and the lock, I would say, were the two outstanding features of a door mechanism.

The feature of the Lindstrom patent incorporated in the mechanism which the Enterprise Company sold to the B. & O. was the safety feature at the side of the car; lost motion and safety feature at the side of the car. The importance of that safety feature is to protect the life of the operator.

CROSS EXAMINATION

By Mr. Owen:

Referring to Sage and Wilder patent, Exhibit 14, in that type of hopper bottom car shown, the doors opened lengthwise of the car, and two doors are hinged side by side crosswise of the car, each of these doors having a downwardly or outwardly projecting flange around its edge. In order that the doors may be operated in unison, a tie or cross bar is provided which extends across the outer sides of the two doors of a pair near the free edges of the doors. A feature of the Sage patent was the bending of such edge flange outward and in line of the surface of the door to provide spaces for receiving the cross or tie bar, thus eliminating the necessity of either having the bar extend around such flanges or of cutting the flanges away to receive the bar. The only flanges of the doors that are pressed outwardly to provide rests for receiving the cross bar are the flanges at the inner or adjacent edges of the two doors. This has nothing to do with the flanges at the outer edges of the doors, so far as the arrangement shown in Exhibit 19 is concerned. And it has nothing to do, per se, with the latch mechanism used in connection with Exhibit 19.

We were at the time furnishing these continuously to the B. & O. in other cars being built, upon which our door mechanisms were used; not latch equipment at all, door mechanisms. We had been furnishing them continuously before.

"XQ57. Have you anything to show that the contract which you received from the B. & O. for the latch mechanisms in question was given in consideration of your company giving the B. & O. the right to use the Sage and Wilder patented feature on the cars on which the latch feature was to be used?

A. Yes, it was shown in our drawings. * * *"

XQ59. Then your answer is it is shown in the upper left hand corner of Wine blueprint, Exhibit B?

A. Yes."

I stated that before the B. & O. sale of latches involved in this accounting, we sold an order of 2000 car sets, to the C. B. & Q. in 1922. In general principle they were the same, but they were applied to gondola cars and not hopper cars. They did not include the double step feature.

The locks illustrated in the 1922 Car Builders Dictionary, at page 145, in evidence as Enterprise Exhibit 20, do not include the double step feature. The locks shown in Exhibit 20 do not conform to the locks shown in the Kadel patent in suit and involved in this accounting.

I have stated that at my meeting with Mr. Galloway, purchasing agent of the B. & O. Railroad, he stated that he had made an offer to Mr. Beck for the latches and that Mr. Beck had refused such offer. Mr. Galloway did not say what the offer was in dollars and cents, but as I inferred it, it was at our price, which was a lower price than the Wine Company quotation.

I do not recall talking with Mr. Beck after he came out of Mr. Galloway's office.

REDIRECT EXAMINATION

By Mr. Hobbs:

In arriving at the figure which we quoted to the B. & O. Railroad Company for the locks in question, we took into consideration that our company would have to pay a royalty of fifty cents a car to Sage and Wilder.

GEORGE B. DOREY,

being called as a witness on behalf of the Enterprise Railway Equipment Company, and being first duly sworn, testified as follows:

DIRECT EXAMINATION

By Mr. Hobbs:

My name is George B. Dorey; my address is 551 Hinman Avenue, Evanston, and I am employed by the Enterprise Railway Equipment Company, and amongst my other duties I have charge of patent matters. I have been with the Enterprise Railway Equipment Company since July 1922. I am familiar generally with the facts relating to the negotiations and fulfilling of the order for the latches for the B. & O. Railroad. I am familiar with the latches that were furnished.

Patent No. 993,450 to Ingoldsby, Exhibit 26, discloses and claims some of the features incorporated in the locks sold to the B. & O. Railroad.

I find a disclosure of a hole in the web of the channel with which a locking lever is adapted to engage. I find claims 15 and 16 claim this feature broadly and define the floor beam as a projecting floor beam.

This is further amplified on page 2 of the specification, where these projecting floor beams are defined as channel beams 39, which extend beyond the sides of the car, and as shown in Figs. 2 and 3, where their webs have holes 40 which are adapted to be occupied by the hooked ends of supporting levers 43 pivoted on bosses 44 secured to the sides of the car at suitable points.

"Q8. Will you point out on Exhibit 11 that feature, if you find it in the locks which were sold?

A. We have a projecting—it doesn't show this projecting here, but here is the floor beam (indicating). It is of channel shape and it has a hole in which the locking lever extends. This locking lever is pivoted above the door as shown on the diagram.

Q9. Do you find the hole in the channel web?

A. Yes, sir. There is the hole in the channel web, from the point here to the point here (indicating).

Q10. Do you find the feature of the hole in the web in Enterprise Exhibit 1 which is a representation of the lock which the Wine Company offered to sell to the B. & O. Railroad?

A. No, sir."

Campbell and Zimmer patent No. 1,584,841, Exhibit 27, shows features or disclosures which were incorporated in the latch sold by the Enterprise Company to the B. & O. Railroad.

I find a hook having a curved shoulder which engages with a correspondingly curved lower flange of a flange member, this flange member having a web lying adjacent to the shank of the hook when the door is in closed position, so that the hook engages the full depth of the web of the beam. I find a number of claims directed to this feature, also, in the patent. The feature just referred to is not found in the drawing, Enterprise Exhibit 1.

The hook in this case engages beneath the projecting flange of an angle shape member. It does not extend below the web or embrace the point of the web of the angle shaped member. There is advantage in having a hook engage with the channel as it does in the Enterprise lock, rather than the way it does in the Wine lock as shown in Exhibit 1—a very great advantage, because in the case of the construction shown in the Wine lock, there is a tendency for the angles to bend upwardly, and in the case of the Enterprise, the depth of the beam prevents bending, and also the fact that the hook lies against the outer flange —lies against the web of the beam, and provides a very strong construction, in which the flange and the web cooperate to provide a strong construction.

In the Enterprise lock you have the strength of the web added to the flange, but in the Wine lock you must depend upon the flange itself. And in addition, in the Enterprise lock the web is supported by the face of the hook. Furthermore, this is a curved section, and the hook is also a

curved section, so that the door can be drawn very tightly by the hook, and it forms a seat all the way from the shank out to the outer edge, or practically the outer edge. Both latches would be about equal, so far as coming open is concerned. Once they are closed, they would both remain closed.

Patent No. 1,446,244, to Campbell, Exhibit 28, has disclosures or features which are incorporated in the Enterprise locks sold to the B. & O. Railroad. Claim 3 calls for the beam member, to be formed of a channel shape, with the lower flange slightly curved, as shown in Fig. 4. This member here is shown in the form of the channel, with the upper flange shown 22.

In the former patent, 1,584,841, there was no upper flange, so that it was just a flange member; this is a further improvement on the last patent, forming the edges of a true channel section.

The features just referred to are not found in Exhibit 1, the Wine lock. In the Wine lock, the hook engages beneath the upper flange, which would correspond to the upper flange of this flange 22 as shown in Fig. 4 of the Campbell patent 1,446,244.

Campbell patent No. 1,464,746, Exhibit 29, shows features or disclosures incorporated in the Enterprise locks sold to the B. & O. Railroad. I find in this construction a casting at the junction of the hopper sheet and the stiffening member, best shown in Fig. 2, and claimed in claims 2, 3 and 4, this casting cooperating with the stiffener as we see in Exhibit No. 9 here, which extended along the lower margin of the bottom hopper sheet, and extended beyond the same for cooperation with the corner casting. The latch is mounted on the corner casting bracket. The corner casting serves as an anchor for a pivot about which the latch operates, and it also acts as a tie for the hopper sheets. There is considerable corrosion takes place, due to impurities in the coal, at the junction of these sheets, especially at the lower portion of the hopper, and the matter of this casting was to form a strong, corner tie, and an adequate

mounting for the latch. That corner tie was one of the parts included among those sold to the B. & O. It was a feature advanced. At that time we were promoting this casting as shown in the Car Builders' Dictionary quite apart from the latch in the 1922 copy of this. These little castings were promoted as articles of merit and designed to fill an existing need at that time. They are shown in Fig. 19 of Enterprise Exhibit No. 20. The B. & O. Railroad cars for which the locks were furnished had on them this corner tie plate, and the pivot of the latch was attached to the corner tie plate and not directly to the side sheet of the hopper. It was mounted independently of the side sheet on the casting itself. This patent, however, does not deal with that phase of it. It merely deals with the casting which acts as a tie. It is in some of these claims, but in general as I will direct your attention to claim 2, for instance. This claim was directed at a member independent of any latch or mounting.

In Exhibit 1 the latch appears to be mounted on a bracket secured to the car side. However, the construction of this hopper is a different type of car. It is applied to a different type of car.

In Exhibit 2 it is pivoted to a bracket, having double walls, or I would say it is mounted on a bracket secured to the car side, the hopper side wall. That bracket does not act as a corner tie place; it is mounted above the lower portion of the hopper, partly on the side sheet, and partly on the stiffener, which extends on the edge of the door. This stiffener, however, was not a part of the B. & O. construction. The B. & O. standard hopper car merely had the side sheet flanged outwardly and downwardly.

Campbell Patent No. 1,547,638, Exhibit 30, shows features or disclosures incorporated in the Enterprise lock sold to the B. & O. Railroad. I find a mounting for a latch which consists of a bracket for double walls, formed integrally, and having a latch, a door supporting latch mounted between the walls and carried by a pin which is mounted

on a bracket independently of the car side by a headed pin which is inserted after the casting is mounted on the car. Claims 1 and 8 are especially to this feature, as I read them.

The circle in red on Exhibit 31 shows the walls at A and B, and a recess is formed at C for the insertion of the headed pin, this door hook pivot being shown at D.

Patent No. 1, 577, 688, to Campbell, Exhibit 32, has features or disclosures which were incorporated in the B. & O. locks sold by the Enterprise Company. I find a construction in which the locking hook itself, the lock hook is mounted independently of the car side, but the locking cam is mounted on a pivot which extends through a portion of the bracket in the car side. This form distinguishes from the previous patents. The rivet which extends through the thimble 5 is shown on Enterprise No. 30. This extends through the car side.

Campbell Patent No. 1,615,794, Exhibit 33, discloses features that were incorporated in the Enterprise locks sold to the B. & O. Railroad Company. I find a number of features in this patent. In fact, practically all the claims are directed to the specific construction of the B. & O. This patent includes the particular form of perforation of the web which limited the extent of movement of the hook inwardly through the web. It also covered the improved mounting, or an improved method of mounting the casting, the latch support casting, by riveting through both flanges of the projecting floor beam or stiffener, as shown at E on Enterprise Exhibit No. 31. I might mention that the particular form of perforation of the web was of importance, as it was desirable to limit the inward movement of the hook so that only the top would engage in the beam and prevent this hook from engaging too far and catching the door when the hook was released and open the door. So that the form of depressed web limited this inward movement to the hook.

This is a different construction than Enterprise Exhibit No. 1 or 2. The two steps were on a hook in this particular case; both steps were mounted on a hook in this

case. There are advantages in having the steps on the channel rather than in the hook, because if two steps were used with a channel,—with a beam of considerable depth, it would mean extending the hook well beyond the channel and make a very long hook.

Campbell Patent No. 1,615,795, Exhibit 34, discloses features which were incorporated in the Enterprise locks sold to the B. & O. Railroad. The main one, or some of the main features of this patent are related to the arrangement of bracket in relation to the hook. The bracket is shown in this particular case as No. 6, on Enterprise Exhibit No. 31. This member was of angle shape, at a point where it was fastened to the door beam or for the major part of its length, and was therefore secured in two different planes by rivets, as indicated at "f" and "g". Also, the engaging of the web, which engages with the hook, was offset to be disposed centrally of the beam when the door was in closed and locked position. I might mention that in cars of this character there is a strong tendency for the beam to overturn, especially when one side of the door is opened before the other, as must necessarily be done when opening the doors; this was a point of criticism, and we overcame this by this peculiar form of bracket which is offset in this way and disposed centrally between the portions of the beam. We can see it very clearly in this view. (Indicating in the upper left hand corner figure in Enterprise Exhibit 31.)

I mark three lines showing the points of attachment of the beam with these rivets at "h" and "j", and another line at "k" showing the web disposed midway between the lines "h" and "j", and therefore tending to stabilize the construction. Those features are not found in Enterprise Exhibits 1 or 2. The hook supports the door entirely to one side of the depending beam or flange.

> "Q48. Mr. Dorey, having in mind the answers that you have made, and the features you have pointed pointed out which contributed to the Ingoldsby latch sold to the B. & O. Railroad, will you

inspect the Kadel patent in suit and point out the differences between that structure and the latch sold by the Enterprise to the B. & O. Railroad, showing the features that are lacking in the Kadel patent structure as compared with those of the Ingoldsby structure?

A. In the Kadel construction, the hook supports the channel through the medium of the flanges in a way similar to that of the Wine construction; that is, instead of the hook going beneath the web and embracing the web, the shoulder of the hook engages beneath the upper flange for maintaining the door in partly open position and beneath the lower flange for supporting the door in fully closed position; whereas, in the Enterprise construction, the engagement of the hook beneath the channel, such as that Enterprise web, utilizes the full depth of the beam and the strength of the web when the door is in fully closed position, and when the door is in partly open position, there is a sharp edge of the web which engages only the tip of the hook, assuring ease of engagement in closing and preventing the hook from engaging readily when the door is opened."

I do not find in the Kadel structure the idea of placing a hole in the web of the channel with which the locking lever is adapted to engage. In Kadel the hook does not engage in the true sense beneath the full depth of the beam so that th web of the channel or the beam lends its strengthening support.

It is only the very tip of the hook which is shown as coming in the web, and furthermore this web is disposed of one side of a vertical line passing through the pivot of the hook and at right angles to the shoulder, and therefore the web would not directly support any load, but the entire strain would be taken by the flange. The web does not have any support from the hook in the Kadel device.

I do not find in the Kadel device the use of a beam having a latch engaging the channel portion with one of the flanges slightly curved for engagement with the shoulder of the corresponding curved latch. I do not find in the Kadel device the use of a corner casting to tie the side hopper sheet and the bottom hopper sheet at their junction. I do not find in the Kadel device the mounting of the latch on a bracket having inner and outer walls, the walls forming the support for the latch pivot, independent of the car side wall; the mounting of the latch on a pivot supported independently of the hopper side wall. I do find the mounting of the latch on a pivot which extends through both the bracket and hopper side wall. I do not find the arrangement of extending the stiffener on the hopper bottom to form a support for the latch bracket; nor a perforation of the web of the channel shaped member to form a temporary support. I do not find an offset in the extension of beam member of the door to dispose the web midway between the extended portions of the main beam member; to prevent twisting of the same.

CROSS EXAMINATION

By Mr. Owen:

Of these patents just referred to, the first with the two step is patent No. 1,615,794. That is the only patent to which I have referred as being owned by the Enterprise Company as having the two step feature. I would include the Ingoldsby patent No. 993,450 as not having the two step feature.

REDIRECT EXAMINATION

By Mr. Hobbs:

I would say that Ingoldsby is not a true two step hook. While the hooks are beveled, they engage and draw the doors tightly against the lower edge of the car side, and they are not true distinct steps.

ARGYLE CAMPBELL,

having been duly sworn, and having been recalled for further examination, testified, in rebuttal, as follows:

By Mr. Owen:

Our company has not manufactured and sold any drop door raising mechanisms as shown in the Ingoldsby patent No. 993,450, Exhibit 26. We have not manufactured any construction in which the only engagement of the hook is in the hole, and not a double engagement in the hole and then under the bar.

Our books of account do not show what portion of the sales price of the B. & O. infringing hooks involved in this accounting was due to the presence therein of any feature of Ingoldsby patent No. 993,450, Exhibit 26. I do not know what part of our profits on said B. & O. sales was attributed to the features of our Ingoldsby patent. I have no way of estimating this.

Our books and records do not show what portion of profits on the infringing B. & O. sale, or of our sales price of same, was due to any feature of patent No. 1,584,481, Exhibit 27. I have no way of estimating this.

Exhibit 27 was one of the patents under which mechanisms or latches were manufactured. Our company did not manufacture and sell any structures like shown in that patent.

Our books and records do not show what portion of profits on the infringing B. & O. sale, or of the sales price of same, was due to any feature of our patent No. 1,446,244, Exhibit 28. I have no way of estimating this. We manufactured and sold a structure like that of this patent, Exhibit 28, to the Burlington Railroad and the Chicago, Indianapolis & Western Railroad.

The date of the Western Steel Car & Foundry order that covered 1000 of the Burlington, is April 28, 1922. Here is another order for 500 from the Burlington, April 29, 1922; and another one for 500 Burlington, April 29, 1922. Here is one from the American Car & Foundry Company,

dated October 23, 1922, covering 207 cars for the Chicago, Indianapolis & Western Railroad.

Our books or records do not show what portion of profit on the infringing B. & O. sale, or of the sales price of same, was due to any feature of patent No. 1,464,746, Exhibit 29. I have no way of estimating this.

I think it might be well there, if you want to be exact, to say, in my opinion, there is not any very good way unless it be estimated on the basis of the number of latches per car and the number of patents involved under which the device is manufactured. I think that can be arrived at that way,—allow the same proportion for each patent involved. In other words, if we must find the relation of a patent to a device where more than one patent is involved, in my judgment there is no way possible except to give equal apportionment to all of the patents involved.

We manufactured and sold structures like that of patent No. 1,464,746, Exhibit 29. I am not prepared to give exact dates or exact numbers. We sold a number of these to a steel company in Birmingham, Ala. I think Sloss-Sheffield is the name and I would guess, or, as I remember, it was only a small number, approximating 50 cars. Our books or records do not show what portion of profits on the infringing B. & O. sale, or of the sales price of same, was due to any feature of patent No. 1547838, Exhibit 30. I have no way of estimating this, only as above stated, that the number of patents involved in the structure as a whole be given the total value, and each one of the several patents involved be given an equal ratio. We manufactured and sold structures like that of this patent, Exhibit 30. I think this patent has a pertinence to the Burlington cars, and also the Chicago, Indianapolis & Western.

The locks sold were substantially the same as patent 1446244. The earlier patents, however, had some of the same features embodied therein. Our books or records do not show what portion of our profit on the B. & O. sales, or of our sales price of same was due to any feature of patent No. 1577688, Enterprise Exhibit 32. I have no way

of estimating this. Our company never manufactured and sold any structures entirely like that of this patent, Exhibit 32. Our books or the B. & O. sales, or of our sales price of same, was due to any feature of Patent 1655794, Exhibit 33. I can estimate this only in the manner of ratio above stated.

I am the Argyle Campbell referred to in Patent No. 1537050, Exhibit I and No. 1537051, Exhibit J, both issued to the Enterprise Railway Equipment Company as assignee, and filed in the name of Argyle Campbell. Those patents are owned by the Enterprise Railway Equipment Company. We have granted license on those. The fee was five dollars a car. The license covered the two patents. The novel features covered by those patents was to increase the cubic capacity of the car, to make it carry a very much larger load and thereby enormously increase its efficiency and reduce its first cost per ton capacity. In detail, they were to provide for the stake conditions at the body bolster to give proper strength and mechanical application to the car, also to provide for the car ladders that they might still be within the clearance provided for the maximum recommended width of cars of this type by the American Railway Association. The novel features of the patents reside in the end construction of the car.

WILLIAM E. WINE

having been duly sworn, and being called for further examination in rebuttal, testified as follows:

I have secured blueprints from the drawings as submitted to the B. & O., which are numbered as follows: 3-B94, 3-B97, 3-B107, 3-B108, 3-B110 and 3-B148, and B-148, and I produce copies of those blueprints herewith, marked collectively as Exhibit K. The Wine Company did manufacture and sell a car door lock embodying the features of the Kadel Patent No. 1434123, Exhibit 5. We manufactured a few car sets of the apertured hook feature of the Kadel patent 1434954, Exhibit 7. We manufactured a few for

experimental purposes. I do not know what road they were put on. The Wine Railway Appliance Company has never manufactured any locks like that shown in this exhibit 6, Kadel 1434953. The only ones that I know of are the cars equipped with the locks furnished by the Enterprise Railway Equipment Company for the B. & O. Railroad. No one that I know of, other than the Enterprise Company, defendant in this accounting, ever manufactured and sold or used railway door locks of the double step type, wherein a channel bar was used to provide the double step feature with which a single step hook engages. The manufacture and sale of locks of the Wine Company has been restricted to the double step hook type.

ARGYLE CAMPBELL,

being recalled by the defendant in the accounting, testified as follows:

I testified that the Enterprise Railway Equipment Company owned patents Nos. 1537050 and 1537051, issued upon my application, which are in evidence as Wine Company Exhibits I and J. The improvements of these patents are used on cars that are A. R. A. standard. The size of the car is increased by the use of these patents. The car in common use, an outside stake car, the standard width inside was 9-5 ½; these cars now using this kind of a structure are 10 feet 1 inch in width inside, except at the ladder, where the old width is maintained, and, I might add, at the extreme top of the bulb angle remained approximately the same; but the increase in width pertains to nearly the entire length of the car.

I testified as to certain sales of 2000 Burlington gondola cars and 207 Chicago, Indianapolis and Western cars, of latch equipment like that shown in Campbell Patent No. 1446244. I further testified that this latch included features shown in Exhibit, 30. Campbell Patent 1547638, and also features shown in Exhibit 27, Patent 1584841.

Referring to the Burlington sales, there were eight

latches per car. The selling price of the latches per car set was $15.00. The net profit per car on the Burlington was $1.5561. The net profit is .1945 per latch, on the Burlington order.

Referring to the sale of 200 car sets to the Chicago, Indianapolis & Western Railway, there were 16 latches per car set. The net profit per car set was $5.68 on the Chicago, Indianapolis & Western. That would make the net profit per latch 36 cents. In the sale of the 4000 latches which are in question to the B. & O., there were four latches per car set.

CROSS EXAMINATION

By Mr. Owen:

I referred to the two patents in evidence as Wine Company exhibits I and J as covering a maximum width car; that is, as I remember, you said that it gave a car of 10 feet 1 inch in width inside measurement. It is true that other companies, or other cars had been furnished prior to my invention in which the inside width capacity was 10 feet 1 inch. The width of 10 foot 1 had probably been used before in cars; I know that that approximate width at least had. But those cars were very scattered, only an occasional lot; they had not become popular; they had not gone at all into general use, only a very occasional order; and at the time of these patents, they had generally ceased to be built, not, very possibly, entirely, but generally that is correct.

> "XQ19. Now, isn't it true that the purpose of your patents, Exhibit I and J, was to provide a place for the ladders in a car of the maximum width of 10 foot 1 inch inside dimension?
>
> A. That, to my point of view, and the stake construction, suitable stake construction, were the two very difficult problems to solve to make a car that would get the increased capacity and meet with the approval of the railway officers."

CERTIFICATE OF EVIDENCE

It appearing that the within and foregoing statement of evidence has been stipulated by counsel and that notice of the lodgment thereof with the Clerk of this Court and notice of the time of the proposed settlement thereof are waived by the defendant-appellee; and it appearing further that the said condensed narrative statement of evidence is true, properly prepared and contains all the testimony taken before the Master material to the hearing of the appeal in said cause; and it further appearing that the portions of said statement of evidence appearing in the exact words of the witnesses is necessary in order that the sense and understanding thereof may be determined:

It Is Therefore Ordered that the said statement of evidence be settled, approved and allowed as a true, complete and correct statement of all the evidence in said cause material to the hearing of the appeal and that the same be filed with the Clerk of this Court and become part of the record on appeal.

Dated at Toledo, Ohio, this 13th day of Sept. 1933.

Geo. P. Hahn,
Judge.

ORDER APPROVING NARRATIVE STATEMENT OF TESTIMONY

(Entered September 13, 1933, by Hahn, Judge)

Present: Honorable Geo. P. Hahn, U. S. District Judge.

It appearing that narraitve statement of evidence has been stipulated by counsel and that notice of the lodgment thereof with the Clerk of this Court, and notice of the time of the proposed settlement thereof are waived by the defendant-appellee; and it appearing further that the said condensed narrative statement of evidence is true, properly prepared and contains all the testimony taken before the Master material to the hearing of the appeal in said cause;

and it further appearing that the portions of said statement of evidence appearing in the exact words of the witnesses is necessary in order that the sense and understanding thereof may be determined;

It Is Therefore Ordered that the said statement of evidence be settled, approved and allowed as a true, complete and correct statement of all the evidence in said cause material to the hearing of the appeal and that the same be filed with the Clerk of this Court and become part of the record on appeal.

STIPULATED PRAECIPE

(Filed September 13, 1933)

To the Clerk of the Said Court:

And now, to wit:—on this 25th day of July, 1933, it is stipulated and agreed by and between the parties hereto by their respective attorneys of record that the printed transcript of record on appeal, taken by the plaintiff in this cause, for filing in the United States Circuit Court of Appeals for the Sixth Circuit shall contain the following:

1. Title Page.
2. Caption.
3. Opinion of Circuit Court of Appeals filed April 6, 1928 on appeal from interlocutory decree, which is also Enterprise Exhibit 8.
4. Decree of District Court entered September 12, 1928, pursuant to mandate of Circuit Court of Appeals.
5. Amended and supplemental statement of account of Enterprise Railway Equipment Company.
6. Report of J. W. Wilson, Master.
7. Wine Exhibits:
   (a) Enterprise Drawing 3531A dated June, 1922;
   (b) Enterprise Drawing 3636-C, dated January 13, 1923;
   (c) Inquiry of B. & O. to Enterprise dated Nov. 16, 1922;

(d) Quotation of Enterprise to B. & O. dated Nov. 21, 1922;
(e) Schedule No. 461 and Enterprise Drawing No. 3600 November 4, 1922;
(f) Letter of Enterprise Railway Equipment Company to B. & O. Railroad, dated Jan. 11, 1923;
(g) Enterprise drawing No. 3626 dated Jan. 11, 1923;
(h) Correspondence exhibit containing Wine letter to B. & O. dated Nov. 27, 1922; telegram Beck to Wine dated January 8, 1923; letter to Wine 1-9-23;
(i) Campbell patent No. 1,537,050;
(j) Campbell patent No. 1,537,051;
(k) Wine drawings submitted to B. & O. Nos. 3-B-94, 3-B-97, 3-B-107, 3-B-108, 3-B-110, 3-B-148.

8. Enterprise Exhibits:
1. Photograph of Wine lock submitted to B. & O.;
2. Photograph of Wine lock submitted to B. & O.;
3. Pilcher Patent No. 1,434,145.
4. Kadel & Pilcher Patent No. 1,268,725;
5. Kadel Patent No. 1,434,123;
6. Kadel Patent No. 1,434,953;
7. Kadel Patent No. 1,434,954;
9. Drawing of infringing structure being p. 123 printed record on previous appeal;
10. Drawing infringing structure, p. 122 printed record on previous appeal;
11. Comparison drawing Kadel patent in suit and Enterprise infringing lock;
12. Letter Campbell to Sage, dated Jan. 5, 1923;
13. Agreement between Sage & Wilder and Enterprise;
14. Sage & Wilder Patent No. 1,204,692;

15. Photograph No. 6270-LD showing Sage & Wilder device;
16. Pencil drawing showing Sage & Wilder;
17. Pencil drawing showing Sage & Wilder;
18. Enterprise Drawing No. 1661, June 3, 1915;
19. Photograph of B. & O. Car;
20. Pages 144, 145, 166, 167 and title page Car Builders Cyc. 1922;
21. Letter Dec. 4, 1922 Sandman to Campbell;
22. Letter Dec. 28, 1922, Campbell to Thornley;
23. Agreement between Pressed Steel Car Co. and Enterprise on Safety Clutch;
24. Zimmer Patent No. 1,059,422;
25. Lindstrom Patent 865,920;
26. Ingoldsby Patent 993,450;
27. Campbell & Zimmer Patent 1,584,841;
28. Campbell Patent 1,446,244;
29. Campbell Patent 1,464,746;
30. Campbell Patent 1,547,638;
31. Drawing attached to Plaintiff's Interrogatories, p. 119 printed record on prior appeal;
32. Campbell Patent 1,577,688;
33. Campbell Patent 1,615,794;
34. Campbell Patent 1,615,795.

9. Exceptions of plaintiff to Master's Report.

10. Memorandum of Opinion of Judge Killits filed April 13, 1933.

11. Decree and order of Judge Killits entered June 15, 1933.

12. Findings of fact and conclusions of law of Defendant.

13. Order adopting Findings of fact and conclusions of law of Defendant.

14. Stipulation and order extending time to lodge narrative, filed July 25, 1933.

15. Stipulation and order extending time to lodge narrative, filed August 11, 1933.

16. Stipulation and order extending time to lodge narrative, filed September 5, 1933.

17. Petition for appeal.

18. Assignment of errors.

19. Order allowing appeal and fixing supersedeas bond.

20. Citation.

21. Supersedeas and appeal bond.

22. Stipulation respecting narrative statement of testimony.

23. Narrative statement of evidence adduced before the Master on accounting together with certificate of the court respecting the same.

24. Order approving narrative statement of testimony.

25. This stipulated praecipe.

26. Stipulation re certification of record.

27. Clerk's Certificate.

It is further stipulated between the parties, subject to the approval of the District Court and the Circuit Court of Appeals that in addition to the matter called for in this stipulated praecipe, either party shall have the right to treat any documents, papers or exhibits in the present and preceding appeals in this litigation as physical exhibits and to produce and use them in the Court of Appeals with the same effect and force as if certified by the Clerk of the District Court.

Deliver all papers to the Wilkinson-Sloat Printing Company, Toledo, Ohio, for printing.

George I. Haight,
Attorney for Plaintiff-Appellant.

Owen & Owen,
Attorney for Defendant-Appellee.

STIPULATION RE CERTIFICATION OF RECORD

(Filed September 13, 1933.)

In accordance with Section 6 of Rule 44 of the Revised Rules of this court, it is hereby agreed by and between the parties to this cause, by their respective attorneys, that the record as presented to the clerk of this court by the printer may be certified by the clerk as required by law and the rules of the United States Circuit Court of Appeals for the Sixth Circuit as a true, full and complete copy of the original pleadings, papers and orders in this cause as set forth in the praecipe for the printed transcript of record without further comparison by the clerk.

Owen & Owen,
Attorneys for Defendant.
George I. Haight,
Attorneys for Plaintiff.

CERTIFICATE OF CLERK

Northern District of Ohio, ss.

I, F. J. Denzler, Clerk of the United States District Court within and for said district, do hereby certify that the foregoing printed pages contain a full, true and complete copy of the record and all proceedings in this cause, including the petition for appeal, assignment of errors, order allowing appeal and the bond on appeal, in accordance with the praecipe for transcript filed herein, the originals of which, except certain exhibits withdrawn by leave of Court, remain in my custody as Clerk of said Court.

There is also attached to and transmitted herewith the citation issued and allowed herein.

In testimony whereof, I have hereunto signed my name and affixed the seal of said court, at Toledo, in said District, this..... day of....., A. D., 1933, and in the 158th year of the Independence of the United States of America.

F. J. Denzler, Clerk.

(Seal) By

K. V. Wilson, Deputy Clerk.

PROCEEDINGS IN THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SIXTH CIRCUIT

CAUSE ARGUED AND SUBMITTED

(April 9, 1935—Before: MOORMAN, HICKS and SIMONS, JJ.)

This cause is argued by M. K. Hobbs for Appellant and by C. W. Owen for Appellee and is submitted to the Court.

DECREE

(Entered May 14, 1935)

Appeal from the District Court of the United States for the Northern District of Ohio.

This cause came on to be heard on the transcript of the record from the District Court of the United States for the Northern District of Ohio, and was argued by counsel.

ON CONSIDERATION WHEREOF, It is now here ordered, adjudged and decreed by this Court that the decree of the said District Court in this cause be and the same is hereby reversed and the cause remanded for further proceedings consistent with the opinion of this court.

OPINION

(Filed May 14, 1935)

Before MOORMAN, HICKS and SIMONS, Circuit Judges.

MOORMAN, Circuit Judge. On the former appeal this court held Claim 2 of the Kadel patent No. 1,434,953 valid and infringed. 25 Fed. (2d) 236. On the accounting had pursuant to the court's mandate after remand the District Court awarded damages to the appellee, owner of the patent, in a sum representing the profits made on sales of the infringing device from November 7, 1922—the date the patent was issued.

The patented device was never made or sold by the appellee or any licensee, and the first actual notice appellant had of the patent and its infringement was when the counter-claim was filed in this suit. The first question presented to us for decision is whether the period for which appellant should account for infringement begins as of the date of the issuance of the patent or as of the date of the giving of notice by the filing of the counter-claim. Both parties rely upon Section 49 of 35 U. S. C. A. (R. S. 4900) quoted in the margin.[1] There is a diversity of opinion as to whether this statute applies to a suit for damages for infringement of a patent for a device which has never been made or sold by the patentee or its licensees. *Campbell* v. *Mayor, etc.*, 81 Fed. 182, 184; *Ewart Mfg. Co.* v. *Baldwin Cycle-Chain Co.*, 91 Fed. 262, and *Olsson v. United States*, 72 Ct. Cl. 72, 102, 103, hold that it does not, while *Son* v. *Pressed Steel Car Co.*, 21 Fed. (2d) 528 (D. C. N. Y.) and *Van Meyer* v. *United States*, 47 Fed. (2d) 192, 196 (C. C. A. 2), hold that it does. *Dunlap* v. *Schofield*, 152 U. S. 244, does not decide the question because it there appeared that the plaintiff made and sold the patented design. Reference is made by the parties to decisions on process patents which in their

[1] "It shall be the duty of all patentees, and their assigns and legal representatives, and of all persons making or vending any patented article for or under them, to give sufficient notice to the public that the same is patented; either by fixing thereon the word 'patented,' together with the day and year the patent was granted; or when, from the character of the article, this can not be done, by fixing to it, or to the package wherein one or more of them is inclosed, a label containing the like notice; and in any suit for infringement, by the party failing so to mark, no damages shall be recovered by the plaintiff, except on proof that the defendant was duly notified of the infringement, and continued, after such notice, to make, use or vend the article so patented."

nature cannot be marked. In these there is also a diversity of opinion. See *United States Mitis Co.* v. *Carnegie Steel Co.*, 89 Fed. 206 (C. C. Pa.); 90 Fed. 829 (C. C. A. 3); *United States Mitis Co.* v. *Midvale Steel Co.*, 135 Fed. 103, 112 (C. C. Pa.); *Wagner* v. *Corn Products Refining Co.*, 28 Fed. (2d) 617, 618 (D. C. N. J.); *Churchward International S. Co.* v. *Bethlehem S. Co.*, 262 Fed. 438, 441 (D. C. Pa.), reversed on other grounds 268 Fed. 361; *Parker Rust Proof Co.* v. *Ford Motor Co.*, 23 Fed. (2d) 502, 503 (D. C. Mich.). In the absence of a persuasive uniformity of decision, we give the statute a construction which seems to us to carry out its purpose. Viewing it in the light of the statute it succeeded, it seems to us to limit the remedy of a non-user patentee who has not given notice of infringement to an injunction. The earlier statute provided "that in all cases where an article is made or vended by any person under the protection of letters-patent, it shall be the duty of such person to give sufficient notice to the public that said article is patented, . . ." (12 Stat. 249.) That statute required any person making or vending an article under the protection of letters patent to give the notice, whereas the present one requires that notice be given by all patentees and their assigns and legal representatives, and also, by all persons making or vending the patented article. Thus under the earlier statute a patentee who did not make or vend the article was not required to give the notice, but under the present statute the patentee, his assigns and legal representatives must give it, whether they do or do not make or vend the article. This is the only difference between the two statutes, and in our opinion the amendment to the old statute as embodied in the new requires the patentee or his assignee who does not make or vend the article to give notice of the patent and limits the recovery for infringement thereof to damages sustained thereafter. As no notice was given in this case until the date of the filing of the counterclaim, the period of accounting began on that date.

The appellant further contends that the court should have apportioned some of the profits from the sale of the infringing device to it and not awarded all of them to the appellee. The profits were derived from a single order given the appellant by the B. & O. R. R. Co. The

proofs show that appellant obtained the order by agreeing to furnish the infringing device, and had it not done so, the appellee would have made the sale. It appears, too, that the appellant's device derived its value—certainly for the purpose of the sale—from the inclusion therein of the invention. In this situation we think the appellee is entitled to recover all of the profits. *Crosby Valve Co.* v. *Safety Valve Co.*, 141 U. S. 441, 454. The profits being susceptible of determination, no royalty should be awarded.

It was not error to refuse to allow a deduction from profits of 33-1/3 per cent. for overhead. The selling of the infringing device was merely an incident to the appellant's regular business. The device was not manufactured by appellant but by another company for it, and it cannot justly claim a deduction of overhead expense from profits.

The refusal of the trial court to allow a deduction of income taxes paid by the appellant on the profits was based on *Larson Co.* v. *Wrigley Co.*, 277 U. S. 97. The deduction was not allowed in that case because there was deliberate wrongdoing, but the opinion states that there may be cases where such deductions would be proper. An example is *Stromberg Motor Devices Co.* v. *Detroit Trust Co.*, 44 Fed. (2d) 958, 965, where there had been no deliberate or wilful infringement. Another, it seems to us, is the case at bar. There was reason for a good-faith belief on the part of appellant that the patent was invalid or, if valid, not infringed. These questions were not determined finally in favor of the appellee until the decision of this court. We think the appellant should be allowed a credit on the recovery in the amount of income taxes paid by it on its profits from selling the device.

The decree of the District Court is reversed and the cause remanded for the entry of a decree in an amount representing the profits derived by the appellant from the sale of the device after notice was given by the filing of the counter-claim, less the income taxes paid by the appellant thereon.

UNITED STATES CIRCUIT COURT OF APPEALS
FOR THE SIXTH CIRCUIT

I, J. W. MENZIES, Clerk of the United States Circuit Court of Appeals for the Sixth Circuit, do hereby certify that the foregoing is a true and correct copy of record and proceedings in the case of *Enterprise Railway Equipment Company* vs. *Wine Railway Appliance Company*, No. 6640, as the same remains upon the files and records of said United States Circuit Court of Appeals for the Sixth Circuit, and of the whole thereof.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the seal of said Court at the City of Cincinnati, Ohio, this 9th day of July, A. D., 1935.

J. W. MENZIES,
Clerk of the United States Circuit Court
(SEAL) *of Appeals for the Sixth Circuit.*

SUPREME COURT OF THE UNITED STATES

ORDER ALLOWING CERTIORARI—Filed October 14, 1935

The petition herein for a writ of certiorari to the United States Circuit Court of Appeals for the Sixth Circuit is granted. And it is further ordered that the duly certified copy of the transcript of the proceedings below which accompanied the petition shall be treated as though filed in response to such writ.